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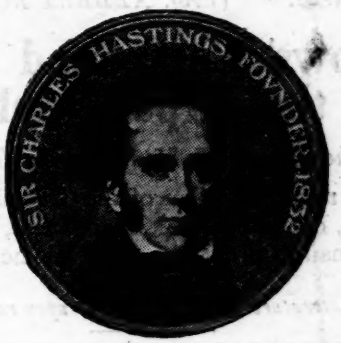

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EIGHTY-NINTH ANNUAL MEETING
OF THE

British Medical Association.

Held at Newcastle-on-Tyne, July, 1921.

SECTION OF RADIOLOGY AND ELECTRO-THERAPEUTICS.

ROBERT KNOX, M.D., President.

PRESIDENT'S INTRODUCTORY REMARKS.

IN opening the meeting of this Section I feel compelled to refer to the tragic circumstance which has led to my appearance in the chair. Dr. Ironside Bruce was the President-elect for this meeting, and I cannot too deeply deplore his untimely death. He was one of our pioneers, and had rendered most important service in the advancement of radiology since the discovery of *x* rays by Professor Roentgen in 1895. It is most probable that he sacrificed himself in the prime of a useful career by his devotion to research, for it is clear that in some way over-exposure to *x* rays had induced changes in the blood which terminated fatally.

The Need for Research.

In any case the tragic circumstances of his last illness have directed attention to the changes induced by penetrating radiations, particularly upon the blood constituents, which, when fully investigated, may lead to very important discoveries as to the method of action of the ray from *x*-ray tube and radium. That these agents exercise a far-reaching action no one will deny. I believe that a systematic investigation of the action of rays upon tissues will lead us a long way on the road to accurate therapy, and I am strongly of opinion that in the blood we have a tissue peculiarly adapted for such systematic research. It is not merely the use of blood counts, total and differential, that should be of service, useful though such counts undoubtedly are. It should be possible to extend our researches in other directions—for example, what do we know about the changes which take place in the blood corpuscle itself, what nuclear changes have been noted? Then there are the changes which action on the tissues may induce in the serum. The work done up to the present has thrown some light upon the action of radiations upon the blood cells. I would strongly urge an extended field of action in blood observations. In this field alone there are boundless opportunities for many research workers.

It is obvious, in view of the now well known dangers of over-exposure to radiations, that all precautions should be taken to protect the patient and the worker from such over-exposure. These important points have already been dealt with by a special committee, which has issued a preliminary report stating the measures of protection which are required in the light of our present knowledge. It is extremely likely that these may have to be reinforced when deep therapy on intensive lines becomes more general. It will become necessary for all departments to be overhauled with a view to securing adequate protection for workers. Inspection of departments by experts should become a routine practice.

Intensive Treatment of Cancer.

The interest of the public in matters pertaining to the treatment of cancer by *x* rays has recently been stimulated by announcements in the lay press of very radical changes in treatment. It is greatly to be deplored that any such announcements, even including a percentage quoted of actual cures, should have been made public before time has been allowed to elapse for the thorough testing of the method of treatment and the percentage of cures.

The facts upon which these claims have been based are as follows: Drs. Wintz and L. Seitz, of Erlangen, have been treating cancer, and particularly cancer of the uterus, by *x* rays, and have published papers giving a remarkable percentage of cures. The results have been obtained by a technique the chief feature of which is the administration of a large single dose directed towards the primary lesion. They state that if the carcinoma is strictly localized, then one sitting will suffice; but they add, "As, however, one can never be sure beforehand in the case of carcinoma that new formations have not already taken place, we must irradiate the area of tissue which lies adjacent to the pelvic wall with the full carcinoma dose. In six weeks after the first irradiation, the condition of the blood having fully recovered, the skin can also receive a fresh dose without danger after that time. The parametrium on the right is then irradiated. After another six or eight weeks the irradiation of the left parametrium is carried out in like manner."

The improvements in the instrumentation consist in the use of a twin-coil installation which is capable of giving a high voltage in the secondary (estimated at from 180,000 to 200,000 volts), and in the employment of an *x* ray tube capable of continuously passing a current of 2.2 milliampères at that voltage. The dosage has been very scientifically measured by means of the Ionto quantimeter, which is a specially adapted ionization chamber.

The theory of the technique is based upon what is termed the "carcinoma dose," and it is stated that each portion of the tumour must receive this dose if success is to be obtained.

Work of a similar nature has been carried out in other centres in Germany, and a variety of apparatus devised to give the required voltage. For this advance in radiological technique the German workers are entitled to full credit, and I freely acknowledge that they have done a great deal to advance the scientific side of the work. But it would be well to withhold judgement in this important matter, particularly with regard to the percentage of cures obtained by the new method, for some considerable time. Time will prove the value of the *x*-ray treatment of carcinoma, and until a large number of cases have been treated in this country we cannot express an opinion on the value to be attached to the claims put forward.

Recently the authorities of the West London Hospital have called attention in the lay press to the fact that they have installed a German *x*-ray outfit for this intensive treatment of cancer, and this has been magnified into a "new cure for cancer." They quote the German statistics and assert that 80 per cent. of cases treated have been cured clinically. We cannot too strongly deprecate this action on the part of the authorities of the West London Hospital. The exploitation of "a cancer cure" in such a totally unscientific and unwarranted manner is worthy of the strongest condemnation. No pronouncement on a subject of such importance should have been made at all, and certainly not to the lay press, until the hospital authorities had been able to state from the results obtained by their own work that they were able to accept or confirm the German statistics. They must have known that such a publication would rouse hopes in the minds of thousands of people which are doomed to cruel disappointment. Moreover, it would appear from a perusal of the work published by Drs. Wintz and Seitz themselves that the authorities of the West London Hospital have overstated the German claim. I quote from the original paper published in 1919:

"In spite of this we even now do not advocate the treatment of uterine carcinomata by *x* rays alone. In order to do so our period of observation has not been sufficiently long. The chief point, however, which prevents us from demanding in general that uterine cancer should be treated by *x* rays alone is the difficulty of the technique.

"In order to obtain results as described by us it is necessary to take out of tube and apparatus everything that it is possible to get; maximum efficiency is required from the apparatus and the tube; the greatest personal attention is wanted, and before everything from the doctor, in order that he adjusts each field of concentration after careful consideration and in accordance with the best topographical and anatomical knowledge."

In the *Lancet* for July 2nd, 1921, the following is one of a number of statements made in a leading article entitled, "The *x* rays in malignant disease":

"It will be seen that the suggestion in the lay press that cases of malignant disease should go to the radiologist immediately the diagnosis is made, and before operation, is based on the observation of competent observers. There is little doubt that the time has come for us to reconsider our position in dealing with the situation."

This we regard as a most ill-advised pronouncement, and we emphatically disagree with the conclusions expressed. The time has not yet come when radiology

can be regarded as the first choice in the treatment of the majority of cases of malignant disease. We believe that surgery still offers the best prospect of cure in nearly all cases of cancer, and that until much more convincing proof of the efficiency of *x* rays or other form of radiation is forthcoming it would be extremely dangerous to encourage patients to submit to *x*-ray treatment for the cure of these very serious conditions before the advantages that surgery possesses have been fully discussed.

We are of the opinion that a closer co-operation between the surgeon and the radiologist would lead to a clearer appreciation of the value of radiations in treatment, and that in all doubtful cases surgery and radiation therapy should be fully considered. Up to the present combined treatment still offers the best prospects of cure in all cases of cancer; we therefore strongly urge that after operation radiations should be used more extensively than they are at present. We regard *x* rays as a most valuable adjunct to surgical treatment, which when carefully applied renders valuable service.

It is to be regretted that such hasty opinions should have been given so much publicity, and it should be realized that such pronouncements must be harmful to the future of radiology and inevitably bring discredit upon what is really a useful agent in the treatment of disease.

From the lay press announcements on the subject of the treatment of cancer it might be presumed that no work had been done in this country and that our radiologists in general were hopelessly behind Continental workers in this important branch of medicine. Radium and *x*-ray treatment of malignant growths have been carefully studied in many centres in this country for years, and radiologists are fully alive to the value of these agents in treatment. The question of higher power apparatus has been engaging the attention of physicists, instrument designers, and radiologists. *X*-ray workers have been using higher and higher voltages in recent years, and have only been limited by the apparatus hitherto obtainable. Demands for tubes capable of standing up to the higher voltages have been made, and such tubes are now being manufactured in this country.

Several hospitals besides the West London have installed or are about to install the most powerful apparatus obtainable. It may be said in passing that this can now be obtained from the home manufacturers, so that it is not necessary to apply for the imported article. The Cancer Hospital, Glasgow, has, I believe, a German outfit. At the Cancer Hospital, London, where I work we have been using high voltages for many years with improvements in results; we are about to install an outfit capable of working at the 200,000 volts, and a special committee is engaged on the design of a high-tension transformer outfit which will greatly exceed that limit if it should be required. At St. Bartholomew's Hospital high voltages have been used for some time back; indeed, Dr. Finzi has been insistently asking for apparatus that would give him still higher voltages.

I may confidently state that we are in a position in this country to grapple with this problem of the radiation treatment of cancer, that it is being steadily and patiently investigated in a number of centres, and that the true value of radiation treatment will be established.

DISCUSSION ON THE CHANGES INDUCED IN BLOOD CONSTITUENTS BY RADIATIONS.

OPENING PAPERS.

I.—Professor SIDNEY RUSS, D.Sc.,
Middlesex Hospital.

Some Contrasts in the Effects of *X*-rays and Radium upon Blood Cells.

A study of the effects of *x* rays upon the circulating leucocytes of the rat has shown that for a certain measured dose of *x* rays the effects upon the lymphocytes are regular and can be repeated, but simultaneous observations upon the polynuclear leucocytes show quite irregular changes, for an increase or a decrease in their numbers may occur as a result of the exposures.

Observations have also been made upon the effects of exposures on man to rather large quantities of gamma radiation. The subjects were all under treatment for malignant disease, and blood counts were made immediately before exposure to the radiation which lasted for four or five hours; counts were then made two and seven days afterwards. Here again a greater regularity was observed in the effects upon the lymphocytes than upon the polynuclear leucocytes.

The observations have been restricted to finding how the number of circulating cells is affected by the radiation. In the experiments upon rats it was found that a very short exposure to *x* rays of medium intensity and of moderate penetrating power always produced a marked fall in the number of circulating lymphocytes—the reduction being about 50 per cent. for an exposure lasting twelve seconds.[1] The animal returns to its normal lymphocyte count in about twenty-four hours.

If the exposure be repeated, almost the same change takes place. The time of exposure may be prolonged to one minute, or even to five minutes, without any appreciable difference in the effect; the animal, however, takes rather longer to recover from these exposures than from the very short ones. The regularity of these effects upon the lymphocytes is seen in Fig. 1, the percentage drop for

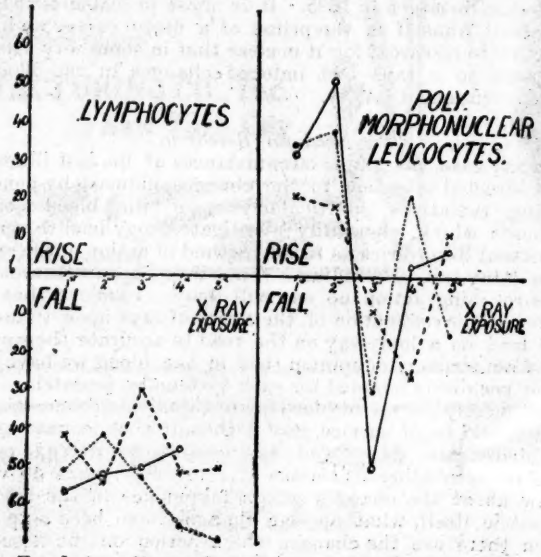

Fig. 1.—× = 12 seconds exposures. o = 1 minute exposures. • = 5 minutes exposures.

exposures repeated at intervals of about a fortnight being represented, showing in all cases a reduction of the numbers of the circulating lymphocytes; the deviations ficant. Simultaneous observations upon the polynuclear from a 50 per cent. change not being often very signiforms show a marked contrast, for the probability of a rise in their numbers appears to be almost as big as of a fall, after the *x*-ray exposures.

As already mentioned, the blood counts upon man were upon patients suffering from malignant disease who were being treated by means of a large quantity of radium (about 5 grams of radium bromide) applied externally to the affected region. In these circumstances the body shared to a large extent in the gamma rays, and it was decided to make complete blood counts with a view to seeing whether the blood changes might serve in any way as a guide to the extent to which the radiation could be applied. In several cases where it was desirable to prolong the irradiation the blood changes were of a sufficiently marked character to suggest the advisability of stopping the treatment for a time. In the 31 cases dealt with here a blood count was taken immediately before the rays were applied and repeated two and seven days later. The blood changes, after an exposure to the radium for four or five hours, were in the majority of cases significant, and here again a greater regularity was observed in the effect upon the lymphocytes than upon the polynuclear leucocytes. The data in Table I show that out of the 31 cases, a reduction in the number of circulating lymphocytes was observed in 20, an increase in 5, and "no

[1] For details of the dose corresponding to this exposure see the *Lancet*, April 26th, 1919, "Experimental Studies with Small Doses of *X*-rays," by Russ and others.

TABLE I.—*Effect of Gamma Rays upon Blood Cells.*
(31 cases.)

	Fall.	Rise.	No Change.
Lymphocytes	20	5	6
Polymorphonuclear leucocytes	12	10	9

change" in 6. Anything less than an 8 per cent. variation is classified as "no change," this being considered a safe margin to allow for the possible error in these counts. The figures for the polynuclear cells for the same 31 cases show that an increase, a decrease, or no change in their numbers was of very nearly the same probability.

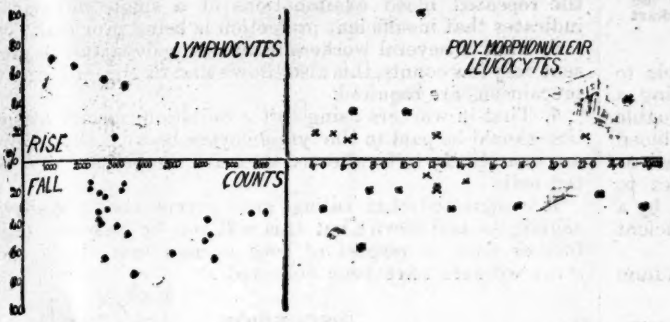

FIG. 2.

No doubt the conditions in these 31 cases were of a very complicated character, for the subjects were not normal, and a septic condition was the rule rather than the exception.

The experimental and the observational data bear upon one another to the extent of showing that both x rays and gamma rays may be expected to cause lymphocytes to disappear from the circulation. It may be worth mentioning that the five cases in which an increase in their numbers occurred were characterized by rather lower lymphocyte counts than the average of the series.

Changes in the red blood cells have also occurred after a single gamma ray exposure; they are not of a pronounced character, however, unless the radiation is very prolonged. Full details of the blood counts relating to the 31 cases considered here are given in a recent report to the Medical Research Council upon "The use of the gamma rays from a large quantity of radium in the treatment of malignant disease," by W. S. Lazarus-Barlow, Helen Chambers, and the author.

II.—J. C. MOTTRAM, M.B., M.R.C.S., L.R.C.P.,
Director, Research Department, Radium Institute, London.

THE USE OF BLOOD COUNTS TO INDICATE THE EFFICIENCY OF X-RAY AND RADIUM PROTECTION.

IT is well known that exposure to x rays and radium causes changes in the cellular content of the blood, and that x-ray and radium workers sometimes present these abnormalities. As a result, it has been suggested that these effects upon the blood will serve as a guide in deciding whether or no the worker is being subject to over-exposure, or, alternatively, whether or no the devices designed for his protection are sufficient.

In order to come to a decision two sets of facts must be reviewed:

1. A general survey of the biological actions of radiation, in order to discover to what extent blood changes may be used as an indicator of over-exposure.
2. A detailed consideration of the blood changes, in order to determine what constitutes a small deviation from the normal.

1. Surveying the biological action of radiation, one of the first generalizations which may be made is that the various tissues differ widely in their susceptibility. Some—for instance, nerve cells—show no change after relatively large exposures, whereas others—for instance, reproductive cells—are altered by small amounts of radiation. The following tissues are especially sensitive: skin, blood vessels, connective tissue, hair follicles, reproductive cells, lymphoid tissues and blood cells. Experimental evidence goes to show that the last three are more susceptible than the others. So much so that these tissues would be especially chosen for examination in searching for the earliest effects of radiation. There is no doubt about the sensitiveness of the reproductive cells—the sterility of x-ray workers who have good health in other respects is very clear evidence. As regards the blood changes, it may be mentioned that experiments on rats have shown that, by their blood changes, x radiation can be detected where a photographic plate gives no record. For this reason, and also because the blood changes have been the subject of much investigation, it may be concluded that they will serve as an excellent indicator for the biological effects of radiation. The present state of our knowledge would lead to the conclusion that in the absence of blood changes the worker had received no more than a harmless amount of exposure to radiation.

It may be mentioned that there is some evidence that the blood changes, more especially in lymphocytes, are independent of the type of radiation. Experiments have shown that soft x rays, hard x rays, and β rays of radium produce the same lymphocytic blood changes in the rat, provided the ionization dose be kept constant. This is referred to because it might be thought that soft x rays and β radiation, which are largely absorbed in the superficial tissues, would cause skin changes under conditions where no blood changes might be expected to occur. More evidence on this consideration is required, but it seems unlikely that the blood of an x-ray worker would escape, whilst his skin suffered injury.

2. Turning now to the detail of the blood changes, it will be convenient to deal first with the lymphocytes. If an animal be subjected to a single exposure a sudden fall in the number of circulating lymphocytes occurs, which is gradually recovered from. If a series of daily exposures be given the lymphocytes can be kept below the normal level, and this is the condition which is found in x-ray and radium workers who are subjected to small daily doses of radiation. It follows that very precise information is required as to the limits of variation among normal individuals, if small departures from the normal are to be detected. If the limits laid down by a number of observers are reviewed, it is found that whereas there is some agreement as regards the average, there is much disagreement as regards the limits of variation. It is clear that an examination of, say, 300 cases, will probably give wider limits than when, say, 50 cases are investigated. The larger the number of cases the wider will be the limits. It follows that what is required is not the normal limits, but the normal distribution of variation, so that when, for instance, a low count is recorded it will be possible to estimate its value.

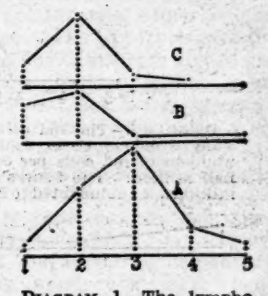

DIAGRAM 1.—The lymphocyte distributions for A, 40 normals; B, 18 x-ray workers; C, 20 radium workers. The counts represent the number of lymphocytes per cubic millimetre of blood to the nearest thousand. The figures at the bottom of the chart represent 1,000, 2,000, etc., to 5,000.

For this purpose 40 normal adult counts have been collected, and the distribution curve is given in Diagram No. 1, A. In the same diagram is shown the counts of 20 radium workers and 18 x-ray workers. The diagram shows without further comment that these workers present an abnormal lymphocyte distribution. If, however, a single blood count be taken, then all that can be said is that there is a great or a small probability of the worker being affected according as to whether his count is much below, or near the centre of, the normal distribution curve, for the reason that very low counts in normal individuals occasionally occur.

What has been said of the lymphocyte counts applies equally to the polynuclears. The corresponding distribution curves are given in Diagram No. 2.

The diagram shows a diminution in numbers of cells per cubic millimetre in both radium and x-ray workers. It can be seen that the radium workers are more affected

than the *x*-ray workers; this difference, however, does not apply (see Diagram No. 1) to the lymphocyte counts, and will be again referred to when red cells are being considered.

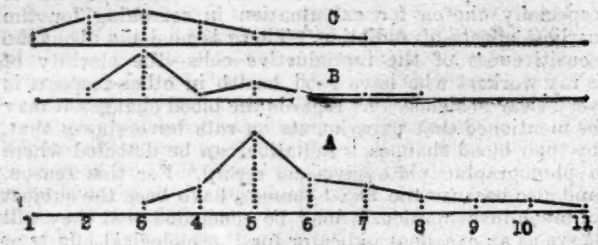

DIAGRAM 2.—The polynuclear distribution for A, 40 normals; B, 18 *x* ray workers; C, 20 radium workers. The counts represent the number of polynuclears per cubic millimetre of blood to the nearest thousand. The figures at the bottom of the chart represent 1,000, 2,000, etc., to 11,000.

Although from a single count it may not be possible to say definitely whether the worker is or is not receiving a harmful amount of radiation, it is certain that valuable information will be given by making periodic blood examinations, more especially if some of the observations are made when the worker first becomes subject to exposure. Under these conditions a fall, followed by a sustained low level, would indicate that insufficient protection was being provided.

The following figures show such a result in a radium worker:

Days of Work:	0.	31.	108.	123.	335.
Polynuclears ...	7,283	3,077	4,890	3,017	3,712
Lymphocytes ...	4,544	1,612	1,270	1,225	1,560

It may be noted that all these counts fall within normal limits, so that from any single count it could not have been said that the individual was abnormal.

The red cells are not as sensitive to radiation as are the leucocytes, so that they make a less delicate indicator. For this reason an anaemia must be looked upon as a grave departure from the normal, and will indicate a serious over-exposure. The red cell changes are shown in Diagrams 3 and 4.

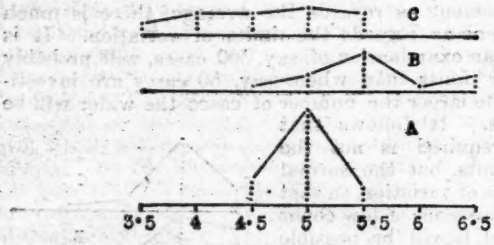

DIAGRAM 3.—The red cell distribution for A, 24 normals; B, 15 *x*-ray workers; C, 19 radium workers. The counts represent numbers of red cells per cubic millimetre of blood to the nearest half million. The figures at the bottom of the chart represent millions. I am indebted to Dr. C. Price Jones for the normal counts.

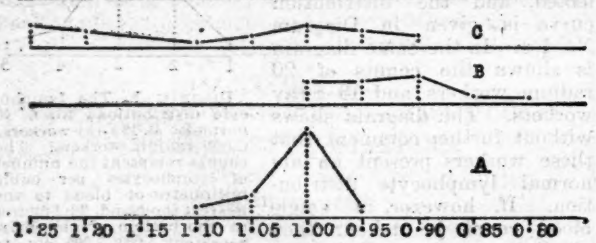

DIAGRAM 4.—The colour-index distribution for A, 24 normals; B, 15 *x*-ray workers; C, 19 radium workers.

The red cells are seen to be diminished in numbers in the radium workers. The haemoglobin content of the blood is less affected, so that the colour index is high. This finding, combined with the fact that there is no evidence of red cell regeneration, and with the associated polynuclear leucopenia, points to an interference with the production of red cells and polynuclears in the bone marrow. Observations on the bone marrow of rats exposed to gamma rays confirms this conclusion. It would seem that the penetrating gamma rays of radium react and injure the bone marrow, whereas the less penetrating *x* rays exhibit their effects chiefly upon lymphocytes and lymphoid tissues which are not protected by a covering of bone.

It will have been noted in Diagrams 3 and 4 that *x*-ray workers present a polycythaemia and a low colour index; however, in view of the fact that the *x*-ray data have been collected from various sources, and that the numbers are very small, all that can be said is that this is a matter for further investigation.

Having now briefly surveyed the changes which are to be found in the blood of *x*-ray workers, it may be concluded:

1. That a single blood examination may give a warning of danger if the count be near the low limit for normals.
2. That a considerable fall with a sustained low level in the repeated blood examinations of a single individual indicates that insufficient protection is being provided.
3. That if several workers in the same department present very low counts, this also shows that further protective precautions are required.
4. That in workers using soft *x* radiation special attention should be paid to the lymphocytes, because these cells are more likely to be affected than are the polynuclears or red cells.

It is regretted that rulings more precise than the above cannot be laid down; but this will not be possible until further data in respect of both normal individuals and *x*-ray workers have been collected.

DISCUSSION.

Dr. ARCHIBALD LEITCH (Pathologist, Cancer Hospital, Brompton) said that he had been very much interested in the charts showing the blood counts, but he was somewhat sceptical of these records. It had been urged that among *x*-ray workers there was a danger of very abnormal blood counts, but he thought that on the whole *x*-ray workers were to be congratulated upon their very good health. The results of the observations given in the papers were of a very striking character. The communications of Professor Russ and Dr. Mottram had at first considerably startled him. He could not say that he believed that if an animal were subjected to a small dose of *x* rays the lymphocytes in a short time would decrease to the extent which had been stated, nor would he say that he disbelieved it. His colleague, Dr. Knox, had desired him to carry out experiments to determine whether it was true. He was loath to attempt such experiments, because a blood count to him was rather a serious matter; for anything less than two and a half hours was an insufficient time to spend upon a blood count, and he did not understand how Professor Russ and his colleagues had been able to take blood counts from rats in about five or ten minutes. Dr. Knox had, however, induced him to make some experiments. It was suggested that if rats were subjected to *x* rays the blood count subsequently taken would show a 50 per cent. diminution of lymphocytes. The problem was where these lymph corpuscles disappeared to; he suggested that their disappearance was by what was now known to be the normal way—namely, through the intestinal canal. His own experiments in detail had been conducted on a fairly large scale, with a large counting chamber, and he took special precautions against bias, which was so likely to come in, unconsciously, even when the worker set out to be most careful. The worker had an idea of what the count would be before the experiment began, and this to some extent, quite without any such purpose on his part, would influence his calculations. In his own investigations, therefore, he stipulated with his colleagues that they should not tell him which rat had been subjected to *x* rays and which had not, and in that way he believed he had avoided bias. He then showed on the lantern screen charts giving the results of a number of counts. In the normal rat variations were enormous; in some cases there was an increase and not a diminution of lymphocytes. Was it not possible, the rats which had been subjected to radiation being very nervous, that the variations were neurotic effects due to the noise of the *x*-ray installation, and that there was a reaction by way of the intestinal canal? It seemed to him very likely that some of the results at all events were influenced by the psychical condition of the subject.

Dr. MOTTRAM replied to Dr. Leitch's criticism by saying that the work he had brought forward had been going on, not for a few months but over a space of years. Before he subjected the rats to *x* rays all the controls were arranged exactly as Dr. Leitch had arranged his. It was impossible for him to criticize Dr. Leitch's methods, because he did not know the full details. Another paper not yet published would bear out the results which he himself had sketched before the Section, proving, to his mind, that they were not fictitious.

Dr. LEITCH added that the plan which he had followed in counting had been in accordance with the most up-to-date methods in use at the present time.

The PRESIDENT regretted that there was not time to pursue this point further, but he hoped that later there would be full discussion in another place.

Dr. H. E. GAMLEN (Newcastle) said that he had himself for a number of years been subject to Roentgen radiations in large doses, and latterly to the more potent radiations employed in deep therapy, and he had no experience of the dire results which had been described. If the rays were as dangerous as they were asked to believe he would have been dead long ago. He had had blood counts taken of several patients, as well as blood counts of himself, and, generally speaking, no changes of any consequence were found. When bad results did occur, it was his opinion that they were caused by the altered condition of the air breathed, due to high-tension currents in it. Noise, fear, and general debility played a great part. Within his experience he could only think of one case in which death might be attributed to excessive radiation. It was a case of recurrent sarcoma of the neck which he treated fourteen years ago and which at first improved under *x*-ray treatment. After a lapse of several months the growth recurred, when it was treated in roasting-jack fashion between two tubes and the patient slowly rotated between them (a method which had been recently revived). On visiting the patient several weeks after her return home, he found her in a very anaemic condition, and she died shortly afterwards.

Dr. J. B. WATERS (Monkwearmouth) said that he had not had any considerable experience of the evil effects described. The diminution of lymphocytes might possibly be due to a physiological process. Another fact which struck him was that the blood which was taken for examination was superficial blood. It was blood from the skin, and the lymphocytes, after the radiation of the patient, might have gone into the deeper tissues. Yet another thing which struck him—he agreed that it pointed in the other direction—was that the plotting of Dr. Mottram's *x*-ray curves showed great similarity to the results obtained with radium, and it was hardly to be believed that nervousness entered into the case if the rats could be influenced by radium to the same extent as they were influenced in the *x*-ray room.

DISCUSSION ON RADIATION IN THE TREATMENT OF DISEASES OF THE BLOOD.

OPENING PAPERS.

I.—G. LOVELL GULLAND, C.M.G., M.D., F.R.C.P.E.,

Professor of Medicine and Clinical Medicine, University of Edinburgh.

CONDITIONS IN WHICH RADIATION MAY BE BENEFICIAL.

MUCH of what I might have said as to the actual effect of radiation on the blood cells has been already dealt with in the earlier papers, and I propose, therefore, rather to give the general impression which a fairly long clinical experience of the blood diseases has left on my mind. I well remember the enthusiasm with which we hailed the first cases of myelocythaemia which were treated by *x* rays. As it chanced, in Edinburgh, all these cases were very successful. The spleen melted away, the white count fell rapidly, the urine showed the big excretion of uric acid which goes with leucocyte destruction, and the general condition of the patients improved markedly. But as time went on we found that the cases relapsed, and that we met with many refractory cases, and I have never again experienced such uniform success as in the first cases.

We must keep in mind what it is that we try to do in using radiation. It has shown its value in the removal of inflammatory products, using the term in its widest sense to include such conditions as lymphadenoma, in restraining the abnormal cell growth in neoplasms of all kinds, and in causing the destruction and removal not only of neoplastic cells, but of cells which have assumed an exaggerated function, such as the thyroid cells in exophthalmic goitre. But it is a two-edged weapon in this respect, that what one may call this calming effect may be preceded or followed by a stimulating effect. The former result is, perhaps, best seen in some cases of exophthalmic goitre in which one finds that radiation will at first produce a marked increase of symptoms, followed later by improvement. The latter result is illustrated by the neoplastic change which may follow on radiation, and it is even possible that the relapses which occur in myelocythaemia, for instance, may to some extent be caused by this stimulating effect, though, from the ordinary tendency of this disease to relapse, this is a matter probably incapable of proof. I confess, however, that it has seemed to me that the more energetically a case was treated the more certain it was to relapse in a relatively short time.

In which of the blood diseases, then, is radiation likely to be useful? Obviously in those associated with hyperplasia rather than in those with hypoplasia of the blood elements, in the leukaemias rather than the anaemias. No one would attempt to treat a secondary anaemia by radiation of the spleen or long bones. The place of radiation in these conditions, if it is indicated at all, is in the treatment of the causal agents—cancers, uterine myomata, etc.—in so far as these are not susceptible of removal in other ways. Chlorosis, if it is really due to an excess of blood plasma and the attempt of an overworked marrow to keep the plasma full of corpuscles, might conceivably be treated by radiation; but so long as ferrous carbonate is to be obtained even the most enthusiastic radiologist would hardly experiment in this direction.

Pernicious anaemia merits more consideration, for though there is in it a hypoplasia of the elements of the circulating blood, there is great hyperplasia of both the red and white corpuscle-formers in the marrow. But whatever theory of the causation of the disease one adopts, there is no doubt that this hyperplasia is necessary and must not be interfered with. My own view of the disease is that it is most often a toxic interference with the proper adult normoblastic blood formation, with the result that the embryonic megaloblastic type of blood formation is again called into action to replace or more usually to supplement the normal function which is temporarily more or less in abeyance. The hyperplasia of the marrow is due to the fact that the death rate of the red corpuscles is high, and regeneration requires to be as rapid as possible. Obviously therefore it must not be checked, and radiation is contraindicated. Many years ago I tried the effect of *x* rays on a series of cases of pernicious anaemia, with uniformly disappointing clinical results. It is further to be noted that radiation has much less effect on tissues of primitive, embryonic, or undifferentiated type than on those more fully developed. It destroys normoblasts more easily than megaloblasts, neutrophils more easily than lymphocytes, myelocytes more easily than myeloblasts. Therefore radiation in pernicious anaemia would still further interfere with the normoblastic function, and the whole purpose of treatment in the disease is to encourage and restore this. If it becomes possible in the future to increase and utilize the stimulating effect of radiation and to exclude its destructive effect, it may yet come to be of service. Occasionally one sees reports of cases of pernicious anaemia which have recovered under radiation. I am afraid this recovery is not due to radiation but in spite of it. Certain cases of pernicious anaemia, in their first and second attacks particularly, have so strong a tendency to recovery that they will get well under the most inappropriate medication, and it is necessary in this disease, in testing any new remedy, to try it in a series of cases, and especially in the later relapses.

Aplastic anaemia in its relation to radiation has lately been brought into prominence—one hopes into a temporary

and accidental prominence rather than a permanent and essential one. There are comparatively few places in which there can be such constant exposure to radiation as in the Radium Institute, and except in isolated cases the radiologist seems to escape anaemia—at least, none of my radiological friends appear to suffer from it—while the leucopenia which radiation induces is not associated with ill health. I find that many perfectly normal people have a white count persistently subnormal. The dangers of a radiologist's life are quite sufficiently great without the addition of a new one, and we all trust that means of protection from it will be found. There is no doubt whatever that radiation, when carried too far, is capable of exhausting the marrow—a power which it shares with arsenic, mercury, and other drugs if they are pushed unduly. I shall refer later to this point in discussing myelocythaemia. Most of the cases in which aplastic anaemia is produced by radiation appear to pass through a pernicious anaemia stage of high colour index before reaching the aplastic stage, for the reason which I have already given, that normoblasts are more readily affected than megaloblasts. Indeed, I regard this fact as one of the strong arguments in favour of my view of the causation of pernicious anaemia, that it is an inhibition of normoblastic function.

One would like very much to know whether it is possible to produce aplastic anaemia in everyone by excessive radiation, for in the ordinary disease, as one knows it apart from radiation, the primary difficulty is almost certainly a congenital deficiency in the bone marrow, which makes it unable to respond to excessive calls upon it. None of my cases of aplastic anaemia had ever been exposed to radiation: in some there had been haemorrhage or septic infection, or the strain of an operation as the starting point; in others there was no discoverable cause. In isolated cases it may chance that a man with this defective marrow may have the scales turned against him by the constant exposure to radiation, but one hopes it is not to be a common occurrence.

There is one disease of the blood in which radiation deserves a much more systematic trial than it has yet received—polycythaemia vera, or Vaquez's disease. Its main features are a great increase of the circulating red corpuscles, often to double the normal number or more, with high blood pressure, and usually with enlargement of the spleen. The cases are very rare, and since it occurred to me to try radiation in them I have seen only one case. In this a course of *x*-ray treatment was commenced, but had to be stopped for family reasons. The patient died some time later of cerebral haemorrhage, out of observation. The marrow in this condition is unduly active, and it is possible that radiation of the long bones might be useful in checking the increased output of red corpuscles. The conflicting results which have been published may perhaps be due to error in diagnosis to some extent, for there are numerous secondary polycythaemias which one could not hope to influence favourably by radiation.

In discussing the leukaemias one must remember that for practical purposes there are three main varieties—chronic myelocythaemia, the commonest, chronic lymphocythaemia, and the so-called acute lymphocythaemia or acute lymphatic leukaemia, which is usually really an acute myeloblastaemia, and which is probably next in frequency to the first form. These react very differently to radiation. The actual cause of the conditions is not known, but a good working hypothesis is that it is due to a neoplastic hyperplasia of different forms of leucocytes. The mobility of the cells involved, as a rule, prevents the formation of any local tumour, though tumours do occur at times, but the cells flood the blood and pervade the organs, showing a special tendency to settle down in the large venous spaces found in the spleen, and to a less extent in the liver and other organs. This results in the familiar enlargement of the spleen, which occurs to a varying extent in all forms of the disease—the more chronic the case the greater the enlargement of the spleen. Part of the enlargement is due to this mechanical distension, part to the fact that as the spleen has to deal with effete cells in the blood it hypertrophies for this purpose, and part to increase of fibrous tissue. The spleen is in no case the starting point of the disease, and the successful results which used to be obtained from *x*-raying the spleen alone in myelocythaemia before treatment of the long bones was introduced, are probably to be attributed to the fact that the organ is extremely vascular, and that a large part of the blood must pass through it and be exposed to radiation.

Let us now discuss the three varieties. It has long been known that radiation was useless, and probably harmful, in acute lymphatic leukaemia. In this form the starting point is always in the marrow. The myeloblasts, the precursors of the myelocyte forms of the three series of granular leucocytes—neutrophil, eosinophil, and basophil—are only found in the marrow in normal adults, and it is they which proliferate in this disease. I forbear to discuss how many of these cases are myeloblastic and how many lymphocytic; for our present purpose it matters little. The condition is sometimes so acute that there may be very little enlargement of the spleen, and even none of lymphatic glands, while the marrow is packed with myeloblasts which take up all the available space and oust the red corpuscle formers. The result is a very rapid anaemia, often of aplastic type, for it matters very little practically whether a terminal anaemia is caused by an inability of the red cells to proliferate, as in aplastic anaemia, or by the filling up of the space in which they can be formed by other cells. In the more chronic leukaemias there is time for red blood formation to overflow into the circulating blood and into the spleen and liver; in the acute form there is no opportunity for this to happen. The rapidly proliferating undifferentiated myeloblasts are apparently not affected by radiation; in some cases in which I tried its effect there was always a rise of temperature and apparently an increase in the rapidity of the anaemia as a result.

The most favourable form for radiation is chronic myelocythaemia, and in regard to this disease a very large amount of experience has now been accumulated. Some time ago, as I was disappointed with *x*-ray results, I began treating all my cases with radium, and while I cannot say that the benefit produced has been any more permanent, it has been more certain and more rapid, and it has seemed to me that the patients improved more in general condition, and especially in recovering from their anaemia. I must leave it to the radiologists to discuss the reason of this if the opinion is borne out by other physicians. The first obvious effect of radiation is a reduction in the white count, which may drop by two or three hundred thousand in a few days. The cells most affected are the neutrophils, of both the myelocyte and polymorphonuclear forms. Next come the eosinophils and basophils, while the lymphocytes and myeloblasts are less affected. Degenerated cells are always found in myelocythaemic blood, but they become more frequent in radiated cases. The normoblasts, which are often present in large numbers, disappear, and in successful cases the blood may return to practically a normal appearance, though one can generally find some abnormal cells. The spleen diminishes in size. I do not think I have ever seen it go back quite to the normal, but it may just be palpable under the ribs and no more. As the fibrous tissue is increased one would hardly expect it to reach normal in size.

The amount of radiation required varies greatly in different cases, partly because of the different periods in the disease at which treatment is begun, partly because of the general condition of the patient, and probably because of unknown factors also. While *x* rays can be given as required, the amount of radium in Edinburgh is limited, and is so much in demand that my leukaemias have had to take their turn, and I have never been able to persist with the treatment as thoroughly as I should have liked. Sometimes I have had four or five cases in my wards at one time, and one had to do the best one could for each in turn. In every case there must be a complete blood examination at least once a week, for it is quite easy to carry radiation too far and produce a condition closely resembling pernicious anaemia, with a high colour index, numerous megaloblasts, and a low red count. This is obviously due to interference with the normoblastic function of the marrow, and if radiation were persisted in would lead perhaps in the end to an aplastic anaemia, though I have never seen it progress so far. I am accustomed to regard a leucocyte count of 20,000 as the signal for stopping radiation, for the effect goes on for some time after radiation has been stopped, both as regards the white count and the diminution in size of the spleen.

It is remarkable, however, in how many cases the red

count improves after judicious radiation, even when no haematinic has been given. This may be due to a stimulating effect of the radiation, but more probably depends on the extension of the space available for red cell formation, and possibly also on the arrest of phagocytosis in the spleen and marrow. Phagocytes are no respecters of persons, and seem to prefer red corpuscles to white.

Not every case proceeds satisfactorily: in some cases severe toxic febrile, digestive, and cardiac symptoms may occur; some refuse to be influenced at all; others improve in white count and spleen to a certain extent, and will progress no further; while all relapse after a longer or shorter time—generally months, sometimes a year or so. Speaking broadly, the earlier a case comes under treatment the better the result, and when one is dealing with a third or fourth relapse the result is not so good as in the first attack, but there are exceptions to both these rules. In the long run all the cases die of the disease or of an intercurrent affection, but I feel sure that the average length of life is greater than it was before radiation became general or than it is with any other form of treatment, though it is usually wise to treat the cases with arsenic or iron as well, according as the colour index is high or low. I have never had splenectomy performed in any case of leukaemia; as the disease begins in the bone marrow, it is quite irrational to remove the spleen, though apparently it is easy and reasonably safe to do so after the organ has been reduced in size by radiation. Splenectomy does not influence the course of the disease, and it has this disadvantage—that it robs the practitioner of a valuable piece of evidence. Whenever a myelocythaemia begins to go back the spleen enlarges. We cannot keep these cases in hospital all their lives, and unfortunately not every practitioner is a haematologist. Why, therefore, deprive him of a valuable physical sign for no reason? Often one finds, indeed, that patients palpate their own spleens and come back to hospital when they find enlargement.

The reason why the myelocythaemias are so much more amenable to radiation than the myeloblastaemias is that the cells affected are of a much more differentiated type, they approach more nearly to a benign tumour. It is evident from the progress of cases that many of the circulating leucocytes are destroyed, but that the rays also arrest their development. For this latter reason radiation of the long bones in turn is sound, both theoretically and practically.

The chronic lymphocythaemias are rare in comparison with the other two forms, and as regards radiation occupy a middle place. Lymphocytes are comparatively primitive cells, both phylogenetically and ontogenetically, and do not respond so well as the granular cells, but improvement does sometimes take place, though never in my experience to the extent common in myelocythaemia. The procedure is exactly the same as in the latter disease. The majority of these cases start in the marrow, but a certain proportion of them seem to start in the lymphatic glands and only spread to the marrow later. Early radiation of the glands in these cases might be useful.

We probably include under the term splenic anaemia a number of conditions which are due to different causes. We are accustomed to think of Banti's disease and the splenic anaemia of adults as being synonymous and to expect the disease to begin at about 30 years of age. During the last six months I have had in my wards five young people, aged from 5 to 17, all of whom had a markedly enlarged spleen, slight anaemia, and a definite leucopenia, and practically nothing else in the way of symptoms or physical signs. These cases are too old for the splenic anaemia of infants, and of quite different type. They are too young for typical Banti's disease, and it is very difficult to place them satisfactorily. The same difficulty occurs in adults. One has to exclude, as far as possible, tubercle, syphilis, lymphadenoma commencing in the spleen, primary cirrhosis of the liver, and a number of other conditions, before one can with certainty assume that a case is Banti's disease and that it is really suitable for the splenectomy which is good treatment in that condition. The operation is based on the theory that the disease is due to a toxin which is located in the spleen, and is removed along with it. There is a certain amount of evidence that the primary home of the toxin is the alimentary canal, and it is well in these cases to make sure that the bowel is in a satisfactory state.

I am convinced, on the one hand, that cases have been splenectomized which were not splenic anaemia and which would probably have recovered with other treatment, and on the other hand, splenectomy in true splenic anaemia is not, in this country at least, the simple and safe operation which it appears to be in America. I grant that splenectomy, when it is successful, does cure the disease if it is done before the anaemia has advanced too far or the liver has become too much involved, but the mortality in my cases has been higher than I cared for. I have therefore of late generally preferred radiation, and it seems to me that this is one of the most hopeful conditions for that treatment. I have had one or two apparent cures and several long remissions, and probably if one were able to keep patients permanently under observation one would be able to get even better results. Quite recently I have had an interesting experience in this connexion.

Ten years ago I had under my care a man who had suffered from haematemesis, and whom I found to be a case of Banti's disease, with large spleen, marked leucopenia and considerable anaemia. I did not think him fit for splenectomy; he was treated with *x* rays, and made an excellent recovery. The spleen diminished nearly to normal, the blood recovered, though the leucopenia persisted. He remained perfectly well, and did not see a doctor for eight years. During the last two years he had several slight haematemeses, and when he reappeared at hospital was rather anaemic from a fairly severe one. The spleen was large, the liver diminished in size, but with iron and radium the blood again recovered and the spleen diminished in size, though, when he went out of hospital it still extended three fingerbreadths below the ribs.

I have no technical radiological knowledge, but it seems to me that the problem of the future in regard to blood diseases in particular is the question of accurate dosage, especially the determination whether the doses should be massive and far apart or small and long continued, and in what way the evil effects of radiation, which I am inclined to think in some cases complicate the disease, may be avoided. I am told that there is no difference in the essential character of the radiation produced by *x* rays and by radium—that if higher voltage could be used *x* rays would give as good results as radium. I trust radiologists will soon be able to increase the penetrating power of their *x* rays so that the two may be on a level, and that we may be able to subject our cases more freely to treatment by this more accessible means.

II.—JAMES METCALFE, M.D.,

Honorary Physician in charge of *X*-ray and Electro-therapeutic Department, Prince of Wales's Hospital, London, N.

Value of Radiation in Leukaemia.

The effect of radiations on the blood constituents is a matter of profound interest and importance to all working radiologists. The increased penetration of *x*-ray radiations, the ubiquitousness of their presence in radiological chambers, and the results produced by their presence are matters that must be carefully studied. I think we all agree that our conclusions at present must be somewhat cautious. Although we have known of their effect on local parts for a long time, it is only recently that their general bodily effect have become evident. The latter is largely due to the increased penetration of *x* ray tubes, and especially of the Coolidge tube.

What is the effect on the body generally? Is it due to an action on all the body tissues—the nerve centres, the muscles, the blood, and the lymph? Or can we say that it is only due to the action on one or other of the body elements? Probably the effect is general in character, but some of us think that it is more especially on elements more or less in a state of flux, such as the blood and the lymph. If the effect be on the mobile elements rather than the stationary ones, the explanation may, I think, be found in the fact that these are essentially carriers and distributors of all the elements required by the other tissues for their proper functioning. It is quite possible that new chemical constituents may be formed in the blood cells which have a deleterious effect on the other tissues of the body.

It is generally assumed that the corpuscles are the parts of the blood usually attacked by strong radiations. That changes occur in the red and white cells is known, but I wish to propound as a theory that perhaps these effects

are after all only secondary, and that the primary attack is on the blood plasma. Amongst *x*-ray workers I have noticed very frequently an attenuation of the tissues: an apparent drying up of the fluid constituents—the lymph and the plasma—before any actual changes in the blood cells could be perceived. Careful observation of the specific gravity of the plasma and alterations in its chemical composition might reveal whether the effect on the blood cells was a starvation—a diminution in the amount of plasma received through the cell wall. If this be so, the question arises whether the result is produced by ionization or is merely a "drying up" of the secretion. I have observed the thickened appearance of the blood, and also the limited amount of the secretion in the joints, evidenced by creaking on movement, in individuals working with *x* rays. There is also limitation of the intestinal secretions producing constipation, and the genital secretions are also diminished. I am not speaking of the spermatozoa—for these are undoubtedly diminished in number, and the individual is often eventually sterile—but of the rest of the sexual secretion. If my theory is correct, I would suggest that *x*-ray workers should always drink a considerable amount of water—three or four tumblerfuls during the course of the day. The amount of plasma would be kept higher and the corpuscles not deprived of their nourishment.

As to the treatment of pathological conditions in which the blood elements are amongst those chiefly attacked, it may be asked whether our methods of radiation are likely to produce permanent relief or cure of many of the diseases associated with them. I agree generally with Professor Gulland's observations. Chlorosis, however, which he thinks theoretically might be suitable for radiation treatment, may, I think, practically be cured. Ferrous carbonate has its drawbacks and limitations, and my remarks on the effects of radiations on the plasma point this out as one of the diseases that may be justifiably treated.

Cases of myelocythaemia show remarkable improvement for a time. The great thing required in these cases is absorption of the radiations by the blood cells. I see no reason why we should assume that it cannot be obtained by the forms of apparatus at present used by radiologists. A great deal has been published during the last few months in the lay press on the marvellous results obtained by powerful apparatus with gas tubes of high vacuum and rays of great penetration, especially in regard to cancer. It is probable that these rays may be more effective in conditions like cancer, where there is a large amount of hyperplastic tissue, and greater penetration is required to produce any effective action on the deeper portions of the growth. I think, however, that it has been very unwise to raise public hopes by exaggerated statements as to what can be done with these radiations until more careful and prolonged observation has been made. Premature publicity of this kind is much to be deprecated.

The blood constituents are readily got at; and the point, to my mind, is whether more rays are absorbed by the mobile elements with extremely high penetration than with those of more moderate power. This has yet to be settled and requires most careful observation.

Professor Gulland has taken us through the chief blood diseases in which radiations have been used. He says that his first cases of myelocythaemia were remarkably successful, although relapses occurred and he has never since experienced such uniform success as in the first cases. This point requires some elucidation. It suggests to me that the technique in his later cases had not, for some reason or other, been as effective as in the earlier ones. After running through the gamut of diseases connected with the blood in which radiation has been used he expresses the opinion that those which can be at all effectively treated by this method are probably Vaquez's disease, some leukaemias, splenic anaemia, and Banti's disease. It is certainly no use in secondary anaemias, and I do not think it is useful in pernicious anaemia. I have treated a good many cases of leukaemia. The following is an example:

A man of 59, with chronic myelocytic leukaemia, had a large hard spleen, bulging forward and reaching down into the pelvis. He had formerly been treated by *x* rays and then by benzol therapy. The red blood cells were 2,532,000, white cells 219,000, of which the polymorphonuclear neutrophils constituted 57.14 per cent. and the myelocytes and myeloblasts 25 per cent. After seven weeks' treatment the blood examination gave red cells 5,350,000, white cells 76,000, and there were 55 per cent. of polymorphonuclear neutrophils and 31 per cent. of myeloblasts and myelocytes. Full pastille doses of rays, with a penetration of 8 to 9 on the Benoist scale, were given through an aluminium filter 3 mm. thick weekly, the rays being measured after passing through the filter. The rays were applied over the spleen, sternum, ends of femurs, and long bones of arms.

I believe this man later had a relapse, but if we can make this return to the almost normal possible, why can we not maintain it? That is one of our problems. I think the dosage must be massive. It must be as powerful as the superficial tissues will stand, but given at rather long intervals. Frequent and small doses only stimulate the abnormal condition.

With regard to splenectomy there is undoubtedly a tendency to use this severe surgical measure too frequently and too indiscriminately. The surgeon argues that the patient has only a very limited time to live and it is worth giving him a chance; but the chances are, to my mind, so bad that it is really a cruel and unnecessary procedure. On the other hand, not all cases of splenic anaemia die even without radiation. Some recover spontaneously.

I have under my care at the present time a bright-looking girl of 12, with numerous multiple sarcomata. The trouble began in the supraclavicular region, but there is now a large swelling involving the sternum. She has had hard radiations for some months through aluminium filters. Her blood count before radiating was 3,000,000 red and 20,000 whites. It is now 5,400,000 reds and 8,400 whites. The growths are not much reduced, but the general appearance is excellent and she feels very well.

In Hodgkin's disease I have had some remarkable results. I will only quote one.

The patient was a big, young married woman, who lost her husband in the war. The disease started early in the war after her husband had left for the front. She developed large masses of glands on each side of the neck, bigger than a man's fist; also some mediastinal glands. Her blood count, which was low, gradually improved under massive doses of *x* rays through aluminium filters, and the glands slowly diminished. She is now almost completely well. A few small remains of glands can be felt on pressure in the neck and supraclavicular regions, but she has no treatment.

My conclusions in regard to the effect of radiations on the blood are: (1) That they produce remarkable improvement in the blood count and general health, and reduce the splenic enlargement and other hyperplastic tissues; and (2) that they are especially useful in some leukaemias, splenic anaemia, and Banti's disease. The earlier improvement is frequently not permanently maintained; but there is great hope that with improved technique this will prove feasible.

In connexion with *x*-ray workers we should take into consideration the facts that *x*-ray workers, if healthy, are much less susceptible to radiations than those of poor physique; and that the bad effects produced by exposure to radiations are much diminished by working in well ventilated rooms; by thorough protection of all apparatus by lead covering; by limited hours of work; by drinking a good deal of fluid (water or light lemonade) during the day; by being out in the fresh air as much as possible when not working; and by the exercise obtained by outdoor games such as golf or tennis.

DISCUSSION.

Dr. W. HOPE FOWLER (Edinburgh) said that experience had shown that in many cases there might be a happy result to start with, but this happy result became increasingly difficult to maintain, and in the end they had the sad experience of seeing the patient gradually get worse. Hitherto thorough cure had not been obtained. If a case did appear to be thoroughly cured it might almost be taken as a certainty that the diagnosis had been wrong. Still, radiation treatment had offered to patients a lengthened prospect of life for one, two, or three years, sometimes for a longer period. Some patients, the more sensible ones, put it to him, "I suppose it is just a question of visiting you for the rest of my life?" and he had replied that they could put it that way if they liked. He had been interested in Professor Gulland's remarks with regard to good results from the use of radium as an alternative to *x* rays, but he believed the attainment of more satisfactory results to be largely a question of the evolution of proper apparatus.

The PRESIDENT said that it was obvious from the two discussions on blood changes that there was material for many more. A clear indication had been afforded for future work on the subject, and he hoped that further discussions would take place.

DISCUSSION ON SURGICAL DIATHERMY.

OPENING PAPERS.

I.—E. P. CUMBERBATCH, B.M.OXON., M.R.C.P.,
Medical Officer in Charge of Electrical Department, St. Bartholomew's Hospital.

IN opening a discussion on surgical diathermy I do not propose to make any reference to the theory or principles of the method, but I wish rather to describe briefly my own clinical experience of its use, to indicate the types of malady for which it can be used with advantage, and to make some suggestions for its further employment. In the subsequent discussion I hope that we may hear the experience of other members in the use of this method of treatment, which, I believe, is now widely employed, although little has been written on it in medical journals.

Diathermy is used for the destruction of abnormal and unnecessary tissue—namely, malignant new growths, innocent new growths, infective granulomata and scar tissue. Before speaking on the clinical aspect of the subject some remarks on the methods of performing surgical diathermy might be made. Tissue can be destroyed by this method in one of the following ways. In the most commonly used method the end piece of the active electrode is placed in contact with the tissue and the current is increased until the tissue is coagulated by the heat. The stronger the current and the longer the time for which it flows the deeper and wider proceeds the coagulation. But before the coagulation has proceeded to the maximum extent possible the current has to be stopped, because the tissue in contact with the end-piece soon dries, and when this occurs the current passes in the form of sparks. Coagulation then proceeds no further and the tissue is charred on the surface. The less moist the tissue the sooner the sparks appear. This is well shown in the case of bone. If the end-piece is placed in contact with it sparks appear almost at once, and destruction spreads only a very short way beneath the surface. It is in the treatment of malignant growths that the destruction must be continued to a sufficient depth. I believe that the failure to prevent the occurrence of recrudescence is, in some cases, due to the failure to coagulate the tissue sufficiently deeply, the current being stopped when sparks appear. Deeper coagulation can be produced by using an end-piece of larger area. A disc of 1 centimetre can be used, and sometimes one of 1½ centimetres, but no larger, because the current density beneath the end-piece will be insufficient to generate heat sufficient to coagulate the tissue at more than a trifling distance.

Discs, bearing prongs of different lengths, may be used. In the electrodes supplied only one, bearing prongs, is provided. The prongs are 6 mm. in length, but other discs, bearing prongs of greater length up to 15 mm., should be tried in cases in which infiltration has extended deeply. The rate at which the current is increased is of importance in regulating the depth to which the coagulation extends. If the current is increased very slowly to its maximum, three or four minutes being occupied in the process, the tissue will dry with corresponding slowness, and the coagulation will extend more deeply. There is a further method of preventing the appearance of sparks altogether. This consists in the constant moistening of the tissue in the region of the end-piece by salt solution. The solution may be dripped slowly from a suitable syringe, care being taken to prevent it from running over the adjoining healthy tissue (for instance, by means of a swab), otherwise the latter may be scalded. By this method the maximum amount of tissue that can be coagulated by various strengths of current could be ascertained.

There is a second method of performing surgical diathermy, and this consists in using a narrow, blade-like end-piece, and simultaneously coagulating and excising the growth. This method must be reserved for those growths that are freely movable over healthy underlying tissues. It requires considerable practice, as bleeding will occur unless the operator is very cautious; and when this happens one of the chief advantages of surgical diathermy is lost, and there is more risk of dissemination of the growth. If this method is used it would be better to coagulate the growth *en masse* before excising it by the blade electrode.

A third method of destroying tissue is by means of the diathermy apparatus. This consists in using the sparks which the apparatus can produce. This method is, in my experience, unsuitable for malignant growths. Destruction cannot be produced to so great a depth as by the other methods. Even if the growth is superficial, there is more likelihood of recrudescence. For certain forms of non-malignant growth the method is very effective, and I shall refer to it later.

With regard to the clinical results of surgical diathermy those obtained in the treatment of malignant growths will be considered first. The most important question for consideration is the degree of prolongation of life without discomfort. There is abundant evidence that disagreeable symptoms can be abolished by destroying the growth by diathermy, and the facts that the operation is speedy, that there is no shock following it, that the stay in bed is very short, and that complications are rare, are now well known, and render the method very valuable. All the experience gained at St. Bartholomew's Hospital during the first few years of its trial, since 1910, was derived from cases which were deemed unsuitable for surgical excision by the knife. The best of the earlier results was obtained with a case of malignant growth involving the tonsil, fauces, palate, and upper and lower jaws. The patient, who was under the care of Mr. Harmer, lived for two and three-quarter years after the first application of diathermy. The operation had to be repeated on five occasions, at varying intervals, for recrudescence. The patient was comfortable until three months before his death. Now if cases are treated by diathermy earlier, the prolongation of life will be greater, and in view of the simplicity of the operation, I see no reason why diathermy should not be given to very early cases, which are regarded as suitable for the knife. For these cases the method of combined coagulation and excision should be tried, and it is possible that cures will be obtained in some cases. Some cases of prolongation of life for a longer period than that above mentioned have been reported, and I should like to learn the experience of others in this matter.

Most of the work on surgical diathermy with which I am acquainted has been performed on growths of the mouth and throat. I have treated growths of the uterus, rectum, breast, and elsewhere, but the cases were so advanced, the growths having spread into parts that could not be destroyed without danger, that the treatment was of necessity incomplete, and where there was improvement it was of short duration.

Regarding complications, that which is most to be feared is haemorrhage. I do not refer to the bleeding that is likely to occur two or three days after the operation, when the patient is in a condition of cachexia. Diathermy is, in my belief, unsuitable for such cases. In other patients haemorrhage is liable to occur when an artery of appreciable size lies close to the field of the operation, and usually occurs about the middle of the second week. It has occurred from the lingual artery in some cases of operation on the tongue. In one of my cases it occurred from the temporal artery, and in another case, under the care of a colleague, apparently from the ascending pharyngeal artery. Some surgeons prefer to tie the vessel from which bleeding may take place, prior to the operation.

Sepsis is, in my experience, exceedingly rare. I have seen only two cases in ten years. In one case sudden death occurred during convalescence, without ascertained cause. Bronchopneumonia may occur after operation on the mouth or throat, but I do not know whether it is less common than after cutting operations on the same regions.

The form of malignant disease in which excellent results may be obtained is rodent ulcer. The invasion of bone or cartilage does not contraindicate the treatment, and the disease may be stopped even if these are involved. I treated a case of rodent ulcer of the scalp, showing cell nests of carcinoma, seven years ago. Periosteum and bone were destroyed during the operation, and although suppuration took place some months later, while the sequestrum was separating, the whole area, except for a small portion near the centre, is now covered by epithelium. Both for this case and another which is still free from recrudescence

four years after the diathermy, other methods of treatment had been previously applied, but without lasting result.

With regard to non-malignant growths, papillomata of the bladder should receive first consideration, because diathermy appears to be the most suitable method of treatment. Smooth scars are left after coagulation, and, so far, I have heard of no cases of reappearance. A case of fibroma of the nasopharynx, under the care of Mr. Rose, was successfully removed by diathermy without haemorrhage, except at the first trial, when an unsuitable end-piece was used. Disc end-pieces should be used. The dangers of fatal haemorrhage when these growths are removed by the knife are known.

For naevi of the mucous membranes diathermy is very suitable, even if other methods have failed and excision is inadvisable. The results after healing are surprisingly good. For naevi in and under the skin diathermy is less suitable. In the case of cavernous naevi it is difficult to prevent destruction of the skin. This takes place before the blood in the naevus coagulates. Healing is then slow, and there is a risk of sepsis.

I have treated a few cases of haemorrhoids by surgical diathermy. In these cases the haemorrhoids were permanently prolapsed. There had been extreme pain and discomfort, and I commenced the treatment by passing a metal rod into the rectum and making the current strong enough to heat the parts in the region to a degree that could be comfortably borne. The relief of pain and spasm was remarkable. In one case the relief lasted for two years. At the end of this time the patient reported and asked if the haemorrhoids could be permanently removed, and I destroyed them under local anaesthesia. Some exudation occurred during the next few days, and a small ulcer was left near the anal orifice, which healed after three weeks. The patient suffered no pain and very little discomfort. The haemorrhoids which I have destroyed by diathermy were partly fibrous and not very vascular, but I believe that other operators have treated some that were thin-walled and contained much blood. I should like to hear their experience and the method which they adopted.

Enlarged tonsils have been excised by diathermy, using the blade electrode. If successfully performed, this treatment would be unaccompanied by loss of blood.

The kind of infective granuloma for which I have tried coagulation by diathermy is lupus. I have treated three cases. One of these has shown no recurrence after two years, and the others were treated one year ago and there has been no reappearance. In one case the nodule was on the shoulder. There is now a smooth unwrinkled scar, though for some months it was erythematous. Another patient had a group of nodules in the region over the maxilla, and in this case keloid has developed in the scars. This was due probably to the quick healing after the coagulation, and might have been prevented by applying pyrogallic acid ointment so as to delay healing. The treatment of lupus by diathermy deserves further trial.

The fact that the new tissue that fills the place left after destruction by diathermy does not shrink or form adhesions with adjoining parts has suggested the treatment of adherent soft palate by diathermy. Mr. Harmer has treated two cases by this method, but without success. The method, however, deserves further trial, and the soft palate should be kept away from the pharynx until healing has taken place. Diathermy might be tried for Dupuytren's contraction of the palmar fascia, but I know of no case for which it has been applied.

There remains for consideration the treatment of growths by means of the sparks which can be obtained from the diathermy machine. This treatment is the same in principle as that known as "fulguration," the difference being the replacement of the high-frequency apparatus by the diathermy machine. With the latter the sparks are shorter and thicker, and can be accurately aimed upon the exact spot desired. This method is not, strictly speaking, diathermy, since the heat is not generated in the tissues, but is applied in the form of sparks. The destruction is, therefore, due to incandescent air. As the sparks fall on the surface the tissue in the immediate vicinity is destroyed by the heat. The destroyed tissue is dried by the heat, and becoming then a poor conductor is pierced by subsequent sparks, and if the latter are gradually lengthened the tissue can be destroyed for about a centimetre in depth. Fulguration is an excellent treatment for warts, either flat or pedunculated, for papillomata of the skin, for telangiectases, and for pigmented areas of skin. With regard to the latter, the method must be performed with extreme thoroughness, or areas of pigment will reappear. I believe, however, that ordinary diathermy is a more certain method. I have treated a large area of skin, deep brown in colour, occupying the greater part of the submaxillary region, part by sparks, and part by diathermy. The former method was less effective, and minute specks of pigment have reappeared.

What I have written above represents, in brief summary, that part of the field of surgery that has been explored by diathermy at St. Bartholomew's Hospital by my colleagues and myself. I shall be most interested to hear the experience of others, and to learn any new methods of applying the treatment, and any other types of growth in other regions that have not been mentioned.

II.—C. W. SCOTT SABERTON, M.D.,

Harrogate.

I do not propose to review the whole subject of surgical diathermy, but will confine my remarks to a description of the utility of this method from my own personal experience of its application in suitable cases and the technique employed. The treatment of cutaneous blemishes by the method known as "diathermic fulguration"—that is, cauterization by sparks from a diathermy machine—I shall purposely omit, as the method is not strictly speaking diathermy.

Technique.—I will first say a few words as regards the technique employed in treating cases requiring a general anaesthetic. My duties in major operations have been confined to responsibility for the application of the indifferent electrode and control of the apparatus during the operation. The current is controlled by means of a foot switch. I use a large flat pliable indifferent electrode, not usually less than 8 in. or 10 in. square, to which is securely fastened a well insulated cable from the diathermy machine. With a patient in the supine position, the electrode is placed under either the shoulders or the buttocks, and is retained in place by the weight of the body. The indifferent electrode is covered by a thick pad of gamgee tissue well saturated in strong warm saline solution (2 tablespoonfuls of NaCl to a pint of H_2O). It is essential that a strong salt solution be used if burns or scalds are to be avoided. If a weak saline solution is employed, the temperature of the pad rises owing to its high resistance to the passage of the current, and steam may form between the pad and the skin of the unconscious patient. The strength of current—that is, the number of ampères necessary to produce coagulation and destruction of tissue, and the choice of an active electrode, depend upon the character and situation of the part treated. I pay little or no attention to the amount of current actually registered on the ampèremeter, because, even if it were an accurate measurement of the current passing through the tissues, the exact number of ampères used appears to me to have little practical value. In actual practice the amount of current may be anything from half an ampère up to two or more ampères. The current necessary for any particular operation is judged by the effect it produces, and not by the amount the ammeter may happen to register at the moment.

Cases Suitable for Treatment.

It is essential that the part we wish to destroy or remove should be accessible to the active electrode. In some cases a preliminary cutting operation is necessary in order to enable the surgeon to place the active electrode in contact with the diseased tissue. We have employed diathermy chiefly, and found it most useful, in the diseases enumerated below (I to VI).

I.—*Naevi involving the Mucous Membrane of the Mouth and Lips.*

In all operations involving the buccal cavity or nasopharynx it is not advisable to use ether as an anaesthetic, as there is risk of an explosive mixture being formed. The indifferent electrode is placed under the shoulders or buttocks, and active needle or pronged electrodes are employed to transfix the tumour. I have found the pronged electrode—that is, a plate electrode fitted with short needles—most useful when dealing with a thick mass of

naevoid tissue. The active electrode is first placed in contact with the mucous membrane covering the surface of the tumour, and the needles are pushed into the growth at the same instant as the current is switched on. The current strength may be increased, if necessary, after the needles have been pushed into the naevoid mass. No haemorrhage occurs when treating naevi in this manner, and we have recently treated a naevus in the roof of the mouth of a bleeder without any haemorrhage.

When attacking large naevi it will be found that considerable current is required in order to coagulate the rapidly circulating blood. When the naevoid tissue involves nearly the whole thickness of the cheek or lip it is necessary to place a finger on the overlying skin, so that the current may be turned off immediately the skin feels hot; otherwise sloughing of the skin will occur. Destruction of tissue takes place beyond the area of visible and palpable coagulation; for this reason it is wiser to destroy rather too little than too much at one sitting; in some very large naevi a second sitting may be necessary to complete the destruction of the mass. This second treatment must not be given until the sloughs have separated and the full extent and effects of the first treatment can be estimated. The sloughs usually separate in ten to twenty-one days. If the growth involves the skin as well as the mucous membrane I treat the cutaneous surface at a later date by means of electrolysis, and use Lewis Jones's bipolar electrode for the purpose. So far no complications have arisen in any of the cases treated, and the results have been all that could be desired.

II.—*Malignant Disease of the Tongue.*

We operate upon all cases of malignant disease of the tongue and floor of the mouth by the diathermic method, believing that any case operable by ordinary methods is much better treated by diathermy, and also that by it it is possible to remove successfully some growths otherwise inoperable. My experience in this class of case has been obtained with Mr. Herbert Frankling, of Harrogate, and I am indebted to him for the following description of the technique he employs:

"The patient is anaesthetized with chloroform, the head being propped up, the mouth kept widely open by means of a suitable gag, and the tongue controlled by a suture placed deeply through the base.

"Removal to the desired extent proceeds on ordinary lines by cutting wide of the growth with the knife electrode, the part to be divided being put on the stretch. If an area in front of the knife becomes charred and it is found impossible to get on, division of the charred mass with ordinary scissors will put matters right. This difficulty may also be obviated by the use of the Cumberbatch knife. There is no bleeding, all vessels being sealed off as the removal proceeds; the lingual artery can be identified as a rule and receive special attention.

"Involvement of the floor of the mouth or the pillars of the fauces is easily dealt with; we have found it easier to work near the lower jaw by this method than by the Whitehead removal with scissors. The area left after removal can be treated by the button electrode, special attention being paid to any tissue divided near the growth."

The removal of a malignant tongue by the above method is quicker than by the use of scissors or scalpel, and is a less formidable proceeding. Other advantages are: a bloodless field of operation, diminished sepsis and septic absorption, and rapid convalescence. A slight rise of temperature sometimes follows the operation. The routine block dissection of the neck precedes or follows the removal of the growth. We have made a point of giving a course of prophylactic *x*-ray treatment as soon as possible after these operations for malignant disease of the tongue.

CASE 1.

M., aged 41 years, first noticed a "pimple" on the tongue on October 23rd, 1917. He was in hospital in Vancouver for two months. A snipping from the tongue proved to be epithelioma. He had "Percy treatment seven or eight times." The patient, who was not a good subject for operation, was suffering when seen by Mr. Frankling on March 26th, 1919, from acute pain in the left ear, and carcinoma of the left side of the tongue, anterior pillars of fauces and floor of mouth, spreading over the middle line.

On April 4th, 1919, diathermic removal of three-quarters of the tongue, the anterior pillar of the fauces, and the tissues in the floor of the left side of the mouth was performed, and on May 6th, 1919, block dissection of the glandular area, including right and left submental, left submaxillary and carotid areas.

A course of twelve *x*-ray treatments commenced on May 13th, 1919. It consisted of a full Sabouraud B, measured "after" filtration through 2 mm. aluminium. A Coolidge tube was used with 9-inch alternate point to plate spark gap. One treatment was administered each week to alternate sides of the neck.

On May 20th, 1919, the patient had gained over a stone in weight since the operation—that is, in six weeks.

On June 3rd, 1919, the right submaxillary gland was enlarged; *x* ray treatment was given to it, and on June 10th it was considerably smaller.

On June 23rd block dissection of the right submaxillary and carotid regions was performed. Tremendous hyperaemia was present, which Mr. Frankling thought was due to the *x*-ray treatment.

The course of twelve *x*-ray treatments commenced on May 6th was completed on August 3rd. The patient continued to increase in weight, and on September 30th weighed 9 st. 13 lb. (without clothes); a second course of eight *x*-ray treatments was then commenced.

By the end of November the patient appeared in perfect physical health, and his weight had increased to 10 st. 7 lb. (without clothes).

A third course of six radiations was given during February and March, 1920, and the patient returned to Canada.

In a letter dated from British Columbia, April 6th, 1921, this patient wrote:

"As it is exactly two years on the 4th of April since Mr. Frankling removed the greater portion of my tongue, I thought that both you and he would be interested to know how I am. There has not been a single sign at any time of either a breakdown or a recurrence. My general health is simply splendid, my appetite good, and I am getting regular and restful sleep. There is no doubt about it, I am a splendid result, and words are inadequate to express my thanks both to Mr. Frankling and yourself. My speech has improved wonderfully, and but for a lisp my friends seem to think I speak very well, etc."

CASE 2.

M., aged 52, had an epithelioma involving the left half of the tongue and floor of the mouth, the whole forming a foul fungating mass.- There were secondary glands in the neck.

On November 28th, 1918, the affected part of the tongue was removed in the manner already described. The floor of the mouth was then thoroughly treated with a button electrode. The operation was rapidly performed, and haemorrhage was almost completely absent. Foul sloughs covered the floor of the mouth, and separated between the tenth and sixteenth days. There was very little pain after the operation. On the morning following the operation the temperature was 98.8°, and in the evening 100.8°; on the second morning it was 98.8°, and remained normal. No complications ensued. The patient's general health rapidly improved, and he was able to speak remarkably well.

On December 20th, 1918, block dissection of glandular areas was performed.

Present condition: When seen on June 1st, 1921, there was no sign of recurrence anywhere. The lingual scar in front was perfectly supple, and posteriorly a little fibrous. The patient felt in perfect health, and had been at work since a week after he left hospital.

CASE 3.

M., aged 71 years, presented an epithelioma of the left side of the tongue extensively involving the floor of the mouth; the right half of the tongue showed leucoplakia.

Operation by diathermy was performed on November 28th, 1918; the left half of the tongue was removed; no haemorrhage occurred during the operation. Thick foul sloughs covered the treated areas and separated between the tenth and twentieth days. A large slough was pulled off by forceps, and some haemorrhage occurred. The haemorrhage was quickly stopped by a hot mouth-wash. No other complication occurred. After separation of the sloughs the remaining part of the tongue and floor of the mouth had a smooth healthy appearance. The temperature was only above normal (99°) on one occasion, the evening following the operation. Sloughs following diathermic treatment should be allowed to separate naturally, and not be pulled off, or haemorrhage may occur, as in this case.

On December 20th, 1918, block dissection of the whole glandular area was performed, and the patient left hospital on December 31st.

He remained well until November, 1919, when he was readmitted with an intrathoracic growth on the left side, from which he died in a few days.

Since October, 1918, we have operated upon 12 cases of malignant disease of the tongue. Up to the time of writing no local recurrence of the disease has occurred in any of the cases.

Three deaths have occurred, one case being that of a woman in which the whole of the tongue, pillars of the fauces, and one tonsil was involved in the disease at the time of the operation. This patient died a few months after the operation from large mediastinal deposits. Another case, a male, developed secondary carcinoma of the oesophagus, and Mr. Frankling performed gastrostomy. Death occurred one year from the date of the diathermic operation.

Diathermic removal of a malignant tongue is followed by cessation of discharge, relief of pain, and rapid improvement in the general health.

III.—*Malignant Disease of the Nasopharynx.*

The results obtained in the two following cases speak for themselves:

CASE I. *Epithelioma involving the Pillars of the Fauces, Soft Palate, and Tonsil of the Left Side.*—In this patient, aged 46, Mr. Steward, of Harrogate, considered the growth inoperable by ordinary methods, and on September 8th, 1918, destroyed all the palpable and visible parts by diathermy. The posterior part of the soft palate was removed. The operation was rapidly performed, and there was no haemorrhage. Thick sloughs covered all the coagulated area; they separated between the fourteenth and twenty-first days. During this time the patient had great difficulty in swallowing owing to partial ankylosis of the jaw. No secondary haemorrhage occurred. Three months later the patent developed an ulcer on the lateral wall of the pharynx beyond the area treated in September. The ulcer gave rise to great pain and difficulty in swallowing. Mr. Steward coagulated the base of the ulcer with a button electrode attached to the end of a special pharyngeal electrode. The treatment relieved the pain and difficulty in swallowing, and no discomfort followed the operation. The patient was discharged ten days later, and was perfectly well for three months, when secondary visceral deposits developed, and death occurred nine months after date of first operation. There was no local recurrence of the disease, and Mr. Steward thinks the secondary deposits in the viscera were present at the time of the first operation.

CASE II. *Nasopharyngeal Sarcoma.*—In this patient, a woman aged 27, the disease commenced with profuse haemorrhage; she came under the care of Mr. Steward in 1913, and, after a preliminary laryngotomy, he performed an extensive operation, which failed to cure the disease. For four and a half years frequent haemorrhages, at times very profuse, occurred, and were kept in check by treating the entire surface of the nasopharynx once a fortnight by means of the galvano-cautery. In September, 1918, Mr. Steward decided to try diathermy. The head of the patient was drawn well over the end of the operating table, and a good view of the growth was obtained by depressing the tongue and retracting the soft palate. The chief part of the disease was situated on the posterior pharyngeal wall. A flat disc electrode was applied for two or three seconds over every part of the surface until the whole area was thoroughly coagulated. After this operation the patient was free from haemorrhage for about two months, when Mr. Steward again applied diathermy. On this occasion, owing to a vigorous application of disc and button electrodes, the anterior parts of the bodies of the second and third cervical vertebrae were injured, and the patient was ill with pyrexia, running up to 103° F. at the end of a week. Two weeks after the operation rough bare bone was felt all over the area treated, and the patient complained of stiffness in the neck. Two months after the operation a large sequestrum separated; it consisted of the compact tissues of the anterior wall of the bodies of the second and third cervical vertebrae. For two and a quarter years following the second operation the patient was perfectly well, there was no sign of recurrence, and no haemorrhage occurred. In March, 1921, a small recurrence limited to the left side of the pharynx was again treated by diathermy. When seen on July 9th, 1921, the patient was perfectly well; there was no further haemorrhage or signs of the disease.

IV.—*Malignant Disease of the Cervix Uteri.*

Until recently the majority of the cases of malignant disease of the cervix we have treated by diathermy have been those considered inoperable by any other means, or for some reason a radical operation was contraindicated. The experience gained in these cases has resulted in our employing diathermy as a means of amputation of a malignant cervix preparatory to a radical abdominal operation. Mr. Frankling considers this combined method of operating has had encouraging results, and that it holds a legitimate place in the treatment of the disease.

We employ three methods of treatment, the method adopted depending upon the stage and character of the disease and the condition of the patient.

1. Destruction by button and disc electrodes of as much of the cancerous mass as possible. In many cases this is all one can hope to accomplish.

2. Supravaginal amputation of the cervix by means of the diathermic knife.

3. Amputation by the diathermic knife, preparatory to a radical abdominal operation.

Very little loss of blood attends these operations. This fact, together with the slight shock and diminished sepsis, makes it possible to employ the diathermic method merely as a palliative in cases where any other active treatment is contraindicated. For a time, at least, foul discharge and haemorrhage are checked, and the end of the patient's life is rendered a little more tolerable.

CASE.

A woman aged 59, seen on March 2nd, 1921, gave a twelve months' history of discharge, recently blood-stained, loss of strength and backache. The menopause had occurred five years previously. The vaginal part of the cervix presented soft fungating growth which bled on touch. The uterus was movable. The vagina was the seat of acute septic inflammation, and there was severe excoriation of thighs, vulva and lower abdomen.

On March 8th, 1921, the whole of the cauliflower-like excrescence was removed by diathermy; the cervical canal was thoroughly charred, and the vagina loosely packed with bipp gauze. The discharge rapidly ceased and the excoriation quickly healed.

On March 23rd, 1921, abdominal panhysterectomy was performed, no attempt being made to do Wertheim's operation, the patient being very fat and the heart muscle flabby. Examination of the specimen removed showed that the carcinoma had been well destroyed by diathermy. Only at one part could anything that looked like malignant tissue to the naked eye be discovered.

The patient made an uninterrupted recovery, and left the nursing home at the end of three weeks.

V.—*Papillomata of the Bladder.*

All surgeons who have had experience of the diathermic method of treatment in this disease are, I think, agreed that it is the best means of destroying these growths. There are two methods of employing the treatment: the periurethral and the open suprapubic.

By the first method, in order to complete the destruction of extensive papillomata, more than one sitting is usually necessary. I have had no personal experience of this undoubtedly excellent method of treatment. For large papillomata Mr. Frankling prefers the open suprapubic method, and I am indebted to him for the following description of the technique he employs:

Method of Operating.

"After a preliminary cystoscopy and mapping out of the tumours the patient is anaesthetized and placed in the moderately high Trendelenburg position and the bladder is moderately distended. The bladder, when exposed, is steadied by two laterally-placed sutures, the ends of each being clamped together with Spencer Wells forceps. These sutures serve to control the cut bladder edges in the subsequent stages of the operation. A suprapubic opening sufficiently large to give a good view of the bladder cavity and the villous growth or growths is made. Adequate exposure is facilitated by the use of suitable retractors. It is usually recommended that these should be of wood, but we have found no disadvantage in the careful use of metal ones. Intact mucous membrane is carefully packed away, by means of wet gauze swabs, to avoid the implantation of any tumour cells during subsequent manipulations, which for the same reason must always be carried out in the most gentle manner possible. If a pedicle be present, it is seized with delicate right-angled forceps and put on the stretch, great care being taken that the villi are not in any way injured; it is then burnt off quite close to the bladder wall with the curved diathermic knife—this burning extends out on to the bladder wall, which has been pulled up by the traction on the pedicle. A charred oval area, greater or smaller according to the degree of the traction exercised, is thus left. If there be any doubt as to the non-malignancy of the tumour—some authorities regard these papillomata 'from the first as papillary carcinomata,' and that is certainly the 'safer assumption from a surgical standpoint and is protective of the best interests of the patient'—and remembering that malignant changes are prone to take place, 'especially about the pedicle,' the area left after removal may with advantage be further treated with the button electrode.

"Subsessile and sessile tumours may be treated in a similar fashion, full advantage being taken of the possibility of 'pulling up' the mucous membrane of the bladder wall at and around the tumour base, and due regard being paid to the possible proximity of a ureteral opening.

"The proper application of the forceps for holding the tumour whilst it is being burnt off can be facilitated by picking up the mucous membrane just beyond the growth on either side by small-toothed forceps with delicate jaws and teeth, and thus pulling away the growth with its basal mucosa. If it should be impossible to apply the holding forceps to the base of the tumour well below its main mass, the mucosa must be incised around the base, leaving an adequate margin of healthy tissue. Picking this up in forceps at one point, the area marked out is dissected away, any suspicion of malignancy being met by removal of the deeper muscular coat of the bladder as well as the mucous membrane, the diathermic knife being, of course, used throughout. Too much stress cannot be laid on the necessity for the utmost gentleness in handling the tumour. Any crushing or other injury will result in abnormal epithelial cells being detached and possibly becoming implanted on the mucous membrane.

"A convenient forceps for holding the tumour base is a ring forceps with ring sufficiently large to encircle the main tumour mass without catching the villi in its bite. We have had made for us by Thackray, of Leeds, such a forceps with the ring part boxed in with thin metal, so that when it is clamped across the base of the tumour the villous mass is enclosed in a small chamber. We think that in practice the utility of this is small. Small 'splashes' of villous growth may be destroyed *in situ* by the small ball electrode.

"As a rule there will be no bleeding from the base of tumours removed in this way, but, should there be any oozing, it is readily checked by a touch of the electrode.

"When it is certain that no growth has been overlooked the swabs are removed, and the bladder cavity is flooded with alcohol to kill any loose abnormal cells that may be present, and the bladder, if aseptic, is stitched up with interrupted catgut sutures, either wholly or leaving a space large enough to admit a small safety drain tube. The parietal wound is sutured in the usual way.

"The separation of the slough is, as a rule, unnoticed. Occasionally we have noted about the tenth day a slight haemorrhage, together with the passage of a slough large enough to be obvious. In aseptic cases the bladder is not washed; the tube is removed on the third or fourth day, and there is seldom much leakage afterwards."

The cases we have treated have done uniformly well, and no recurrence of either symptoms or growth has up to the present occurred in any case. We have also used the open suprapubic method as a palliative measure in the treatment of otherwise inoperable cases of malignant disease of the bladder, with encouraging results.

VI.—*Fungating Malignant Growths of Cutaneous and Muco-cutaneous Areas.*

Our experience in this class of case is mainly derived from growths involving the vulva, anal, and perineal regions. Healing, of course, occurs by granulation after separation of the sloughs, but we believe that little time is wasted, as primary healing in such situations is notoriously difficult to obtain. In favour of this method of treatment we feel justified in claiming more complete removal and destruction of the disease, and absence of septic absorption.

Results of Surgical Diathermy.

After a diathermic operation there is abundant exudation of lymph and oedema of the surrounding tissues. In operations involving the mouth, pharynx or larynx, operators should be prepared for tracheotomy; no case of excessive oedema has so far, however, come within my experience. The sloughs resulting from diathermic coagulation usually separate between the tenth and twenty-first days, leaving a healthy granulating surface. Healing is usually complete in about a month. Generally only a slight rise of temperature follows diathermy, there is little or no shock, and the amount of pain is surprisingly little. I have had no experience of any severe secondary haemorrhage, but this possibility must be borne in mind when operations have been performed in the neighbourhood of large blood vessels. It occurs at the time the sloughs separate. A rapid and marked improvement in the general health of the patient is noticed after diathermic operations on malignant growths in the mouth and pharynx, and in no case have adhesions formed, or has bronchopneumonia developed as a complication.

The chief advantages and disadvantages of surgical diathermy over cutting operations may be tabulated as follows:

Advantages.

1. Tumours otherwise inoperable may be attacked.
2. A more or less bloodless field of operation.
3. In the treatment of malignant disease the danger of metastasis is much less than with a cutting operation owing to the sealing of the blood vessels and lymphatics draining the part.
4. Saving of time due to absence of blood in the field of operation.
5. Operations are frequently less formidable than when carried out by scalpel or scissors.
6. Sterilization of the parts due to destruction of infecting organisms.
7. Complete destruction of visible and palpable malignant disease.
8. There is no surgical shock.
9. Convalescence is rapid.
10. Formation of adhesions is rare.
11. The operation can easily be repeated if necessary.

Disadvantages.

1. Healthy and diseased structures are destroyed at the same time.
2. The surgeon is not always able to see important vessels and nerves.
3. As the destructive process extends beyond the area of visible coagulation, the depth to which coagulation occurs is difficult to estimate.
4. Danger of secondary haemorrhage on separation of the sloughs when operating near large blood vessels.

III.—F. HOWARD HUMPHRIS, M.D., F.R.C.P.E.,

Officer in charge of X-ray Department and Department of Electrotherapeutics, 3rd London General Hospital.

DIATHERMY is an intensive form of high frequency; the current passing through the body has no other effect than that of heat. Its value depends entirely upon the power to produce heat of any required intensity, at any depth, and within any part of the patient's body that may be desired.

In surgical diathermy the current is modified in so intense and concentrated a form as to produce the destruction of tissue; in medical or therapeutic diathermy the current is intended to produce only a slight increase in temperature without destructive effect.

With this latter to-day we have nothing to do, and I will mention surgical diathermy only somewhat briefly, since the opener has covered most of the ground. When used thus the current is essentially destructive; it is useful in cases of haemorrhoids and papillomata of the bladder, lupus, rodent ulcer, moles, and other facial blemishes; telangiectasis, blastomycosis; chronic pharyngitis; naevi, corns, and warts; and in certain forms of malignant disease. The subject of extensive destruction of malignant growths by diathermy is rather out of place in a paper of this sort; but it is one of great value, especially in cases of epithelioma of the bucco-pharyngeal cavity. Its advantages over the cutting operation are several. Inasmuch as it is bloodless, cell implantation is out of the question. Operation is through the mouth, thus avoiding extensive dissection, etc. The technique, however, is not easy to acquire, and must be left in the hands of the specialist.

The surgical diathermy to which I will restrict my remarks is the method introduced by Major Turrell some four years ago, which can be carried out with ease and safety. He called it indirect diathermic fulguration. Originally the patient was placed on an auto-condensation couch, holding the usual bar. The operator brought a small metal point down to within sparking distance of the part to be destroyed. The current employed was about 400 to 500 milliampères. The application permits of great accuracy, and the depth of action can be regulated with certainty. The amount of pain is not great and often quite negligible. More recently Turrell simplified the technique. He found that by far the best fulgurating instrument for general use was a Primus pricker, an instrument sold by ironmongers in threepenny packets for cleaning the nipples of Primus petroleum stoves. Instead of using the bar electrode held in the patient's hands, an electrode 20 × 10 cm. was bandaged on the thigh, arm, or abdomen, and the somewhat cumbersome auto-condensation couch was replaced by a simple and efficient substitute made from a three-ply board backed with zinc and vulcanite and drilled so that a terminal can be fixed.

The technique of the little operation is briefly as follows: Having arranged the patient on the couch or board so that a good light falls on the growth, and the bar in the patient's hands, or the electrode bandaged firmly, the current is slowly turned on until 400 milliampères are registered. This should be done by an assistant. The current is then stopped by means of the knife cut-out switch. The operator, resting his hand on an ebonite rod, or cushion, brings the Primus pricker to a suitable distance from the growth, then calls to his assistant to turn on the current. The sparks are then allowed to flow for a time, varying with the size and depth of the growth or the toleration of the patient, usually from twenty to sixty seconds, and the current is sharply turned off again with the knife switch.

In the treatment of corns I will describe the details of preliminary technique which I have found useful, as they have not hitherto been published. The corn is ground down with a steel burr which fits into the flexible shaft of a vibrator. The corn substance comes away as a fine dust at first; when it ceases to come, owing to the deeper layers not being sufficiently dry, the surface may be levelled with an emery or carborundum wheel, and the little operation stopped for that day. A few days later the process is repeated until all the hard skin has disappeared and the central part of the corn is visible as a dark spot. The patient is then instructed to bandage the foot that

night, to soak the bandage in water, cover with oiled silk, and pull on sock or stocking and return with the water dressing still in place on the following morning. On removing the bandage the corn will be visible surrounded with a whitish layer of skin. If this is fulgurated in the centre with the Primus pricker the patient has usually no further trouble.

Diathermy has brought about immense progress in the treatment of papillomata of the bladder, and is particularly successful in the destruction of these benign tumours. The patient is placed on his back on an ordinary flat table, with the usual indifferent electrode about 18 by 24 cm. under the sacral region, and attached to one side of an ordinary diathermy apparatus. It should be thoroughly wet with saline solution, and kept in good apposition to the skin by means of folded towels. The bladder is then washed out with sterile water until it returns perfectly clear. Then the bladder is injected with more water to a point of slight distension. Indication of this is given by the patient expressing a desire to pass water. Then a special cystoscope is introduced into the bladder. This carries with it a conductor insulated along its whole length except at the tip; the conductor is attached to the other side of the diathermy machine. The cystoscope having been introduced and the lamp lighted the whole of the bladder wall can be examined. When the bare end of the conductor or electrode is in contact with the growth it is withdrawn for 1 cm., the operator tells the assistant to turn on the current, which is continued until the meter registers 250 to 300 milliampères. A rain of sparks flows from the tip of the electrode to the papilloma. After from five to six seconds the tumour will be blanched, and the current is then abruptly switched off. The cystoscope is withdrawn, the bladder emptied, and a final lavage with sterile water given. The patient after half an hour's rest may then go away and the result is usually quite satisfactory. A single application, if properly done and with sufficient intensity, often suffices to effect a cure without recurrence.

The details of each method of using surgical diathermy are the result of personal experience and can only be learned from it; but it is a current easy to handle, safe in its application, and satisfactory in the results obtained.

DISCUSSION.

Dr. WILLIAM HILL (London) said that the use of diathermy could be justified in certain cases, but he was not able to testify to uniformly good results. The dreadful state in which some of these patients came for treatment needed to be taken into consideration and compared with their condition a month afterwards. He had heard it said that there was no reaction, but he had known it to occur. There was sometimes scarrin[illegible]nd fibrosis, though this was no great disadvantage com[illegible]d with the advantages of the method. He protested ag[illegible]t the use of the term, almost universal amongst med[illegible]al men, "inoperable malignant growths." The term was stupid and misleading. Any growth was operable; a surgically ineradicable growth was a different matter. Partial removal of growths was a very common procedure. If a growth could not be completely eradicated it was possible to take away some portion of it. He referred to the extraordinary results obtained with radium in cases of sarcoma. Before treating sarcoma by diathermy radium might be tried. The results with radium were obtained with fair, though not with absolute, consistency, and the rapid diminution of the growth was a remarkable feature. Nevertheless, the more they worked along these lines, the more careful they became in any prophecy as to the ultimate results.

Dr. H. E. GAMLEN (Newcastle) said that, up to the present, his experience of diathermy had not been great. He had had success in the treatment of an extensive naevus of the face and mouth, the mucous membrane of the mouth being treated by diathermy while the skin of the face was rapidly improving under radium. Several warts had been cleanly though not painlessly removed, and a case of internal and external haemorrhoids had been dealt with; as he did not at the time possess the necessary protective instruments, an ordinary pair of clip forceps, protected by a piece of indiarubber drainage tube, was used, the base of the pile was seized, and within a couple of minutes pulled away, as a grape was pulled from its stalk. There were no resulting evils and no haemorrhage, and the patient was quite able to return home in a couple of days. Undoubtedly diathermy had its place and would be more used as experience was gained amongst surgeons. He agreed with the suggestion that before treating cases of sarcoma by diathermy it would be advisable, if radium were available, to try it first.

DEMONSTRATION
ON
RADIOGRAPHY IN GALL BLADDER AND KIDNEY DISEASE.

THE President of the Section (Dr. ROBERT KNOX) and Mr. THOMSON WALKER (Senior Urologist and Lecturer in Urology at King's College Hospital) gave a lantern and print exhibition illustrating the value of radiography in gall bladder and kidney disease.

The PRESIDENT emphasized the value of the lateral position in making a differential diagnosis in both gall bladder and kidney work. His lantern slides would prove how valuable such a position could be. The photographic technique was very simple, although in gall bladder and kidney cases, especially in the former where the outlines of the shadow were very fine and delicate, it was important to eliminate even the slightest movement which would blur the result. Naturally, the exposure must be as short as possible, but the duration of the exposure was controlled by the patient's tissues, and in the case of a stout person it might be necessary to give an exposure of considerable length. The quality of the radiation did not matter greatly; a medium tube was commonly supposed to be best for detail, and provided the patient was not very stout this should be used, but, with thick tissues to penetrate, it was always necessary to take into account the fact that there would be considerable absorption of the radiation. He had tried experimentally various forms of gall stones with different lengths of exposure, and had found that he could get good detail with a soft tube and a long exposure, and good detail also with a penetrating radiation and a short exposure. With regard to the position of the patient, his practice was to employ first of all the ordinary kidney position, and, for gall-bladder cases, to turn the patient round on the abdominal surface, raise the shoulders a little, and expose just below the liver at the back. The third position was the lateral one already mentioned, and this he thought extremely valuable. Multiple gall stones would vary in intensity, but if some were missed altogether the probability always was that others would have sufficient density to give a shadow.

Mr. THOMSON WALKER said that the work of the radiographer and the surgeon went together. Although, he supposed, Dr. Knox would not claim that he could get a shadow from every gall stone, still he could get it very frequently. The technique of the injection of an opaque substance into the pelvis of the kidney had undergone some changes since its first introduction. Collargol was used at first, but it was found that poisoning might occur owing to the drug spreading outside the kidney. Thorium nitrate was next used, but at the Mayo Clinic there had been a death following the use of this substance, for if kept for a certain time it became toxic. Sodium bromide was easy to use, clean, and gave quite a good shadow, not so deep as collargol, but still serviceable; given in a 20 or 30 per cent. solution it did not seem to cause any irritation. Mr. Thomson Walker then showed a series of slides illustrating the results obtained with this method of pyelography. In one instance he was able to show gall stones and kidney stone on the same plate.

At the close of the demonstration the President and Mr. Thomson Walker received a cordial vote of thanks from the Section.

SECTION OF AMBULANCE AND RED CROSS.

Sir JAMES CANTLIE, K.B.E., LL.D., F.R.C.S., President.

THE CLAIM OF "FIRST AID" TO BE REGARDED AS A SPECIAL BRANCH OF PRACTICAL SURGERY.

THE PRESIDENT said: All teachers of Ambulance know how unsatisfactory it is to have to hold an ambulance class in the goods shed of a railway station. The fact that conditions of that kind have had to be endured in the case of such an important branch of surgery as this makes one marvel that so much has been done. Every teacher of Ambulance knows, however, that it could be done much better, and that, given proper conditions, much greater efficiency is possible than exists at the present time.

I began to teach Ambulance in 1878, and I have been lecturing on the subject ever since. My first class was held beneath the arches at Charing Cross. Our illuminant was a candle stuck in a beer bottle. On the wall we had a piece of white paper upon which, with charcoal, we drew diagrams. But I will not harrow your feelings by recalling the experiences which many went through in these early classes. In 1881 there was a medical and sanitary exhibition at South Kensington, the first of its kind. I proposed that in connexion with it there should be an ambulance display. There had never been such a thing before in England. At first the suggestion was received with amusement, but at last it was agreed to. I sent out five thousand circulars announcing it, and three doctors came to see it—a German, a Russian, and a Spaniard. No British doctor came. We had the usual demonstration, with the help of policemen, who used their truncheons. One of the gentlemen who was looking on asked, in broken English, with a German accent, "Where did you get that stick from?" When he was told, he said, "I have taught the world military ambulance; now I go to teach the world civil ambulance." Surely, I said, that cannot be the great man himself, come to see our little show; but immediately I found myself being introduced to Professor Esmarch, who had done such a great work with his first-aid lectures at Kiel University. Has any British university ever attempted to raise ambulance work above what it is at the present time? Esmarch himself asked the public to come to Kiel University, the foremost university in Germany. We have not reached that stage yet. We have not even got within the sacred precincts of hospitals and medical schools.

But what was the effect of that policeman's truncheon? For one thing, as I have said, it taught Germany civil ambulance. Another of the doctors who came to see the display, the Russian, also went home and taught civil ambulance to Russia, and the third, the Spaniard, introduced first aid into Spain. So that from our small beginnings we can say that civil ambulance spread over the face of the globe. Germany taught the world military ambulance, but England taught the world civil ambulance.

On every hand to-day the question of the recognition of the work done by the men and women who volunteered for ambulance work during the war is being raised and discussed. Under the title "Ambulance" is included humanitarian work in many departments which has borne fruit in our hospitals at home and abroad, on every front where help has been called for, in kitchens and sculleries, in wards and operating theatres, on wagon and train, in work-rooms, in clerical and committee labours, in teaching and instruction, and in the performance of innumerable unseen duties which may never become known to the public. How to group so wide a range of good deeds and all that they mean under one title is difficult, but I think that the word "Ambulance," better than any other, suffices to convey to everyone the aim and object of the work performed.

Forty years' experience of teaching Ambulance has brought it home to us that in the interests of the public during peace, as well as in the interests of the soldier in war, the work of ambulance teaching should be raised out of the haphazard methods of instruction which up to the present have prevailed, and that this branch of humanitarian work, regarded, as it should be, as a special branch of practical medicine and surgery, requires relatively as careful an education and as ample methods of technical instruction as any one of the other specialities. As I have already said, Esmarch, the founder of military ambulance, after seeing in 1881 the meaning of civil ambulance in Britain, returned to Kiel, and with the help of two of our greatest ambulance workers, the Princess Christian and Sir John Furley, called the inhabitants of Kiel to the University, and there, under the auspices of the authorities, raised and consecrated the subject of civil ambulance to the higher platform of university teaching. In Britain we have not done so; we have been content to let it be taught as and where it may.

Yet this is delightful work. There is an immense attraction to me in improvisation. Can you make an ambulance wagon, a stretcher, and splints out of nothing? To create something out of nothing is well worth while. I am told that we must have the latest appliances, aluminium splints, and so on. Suppose a man in the country gets kicked by a horse or injured by a reaper, where are you to get your aluminium splints if the nearest town is thirty miles away? If that is what first aid is to descend to, I say good-bye to it. There is no further interest in it. It would mean that there must be a set of the very latest splints at every farmhouse in the kingdom. Do you know that fine dressings can be made with the aid of a good "fat" newspaper? Do you know how to make a hay or straw rope like that which the yokel can make? If not, you are no good for ambulance work. Do you think this important branch of surgery should be allowed to fall entirely into the hands of people who are not doctors? It is wonderful what can be done; let us make it still more wonderful. A railway porter will sacrifice his day's pay in order to take part in a public demonstration. I know that doctors have nothing to reproach themselves with as regards making sacrifices. But much more can be done.

It was the result of my forty years' experience that induced me in 1914 to open the College of Ambulance in Vere Street, London. The building was generously placed at my disposal by Sir James Boyton for twelve months free of charge, and the initial funds were a present to me from the pupils who, on August 6th, 1914, began to assemble at the Polytechnic in Regent Street for ambulance teaching at emergency classes. The testimonial these 3,000 students presented to me was spent in equipping the college. An appropriately equipped technical school was instituted and has attracted tens of thousands to the teaching afforded by the college. The college is open daily, the teaching being continuous. For three years the weekly attendances amounted to over 900, giving an annual attendance of 45,000.

The suitable and commodious premises were placed at my disposal only until September, 1915, but after that date the responsibility for the maintenance of the college was sustained by myself, my own work being unpaid. A number of friends of the college, however, felt that it was too great a burden for any single individual to shoulder such an undertaking any longer, and at a public meeting held on March 23rd, 1918, presided over by Sir James Reid, it was agreed that the college should become incorporated and be a national institution.

The college having become a great centre of teaching ambulance, the authorities feel that there could not be a more fitting memorial than the permanent establishment of an institution furthering the cause to which voluntary ambulance workers have devoted themselves. Ambulance is not a question of to-day but of all time. The first half-hour after injury, be it on the field of battle, in the streets of our cities, in factories, mines, harvest fields, railways, or in the merchant service, is the period of primary importance, and as this critical moment is in civil life left to the public to deal with, it is imperative that the training should be carried out in the best possible manner. Heretofore there have been no real schools of technical instruction of the kind, and it was to meet the urgent need that the college was established.

The teaching given in the college is essentially technical, and the college is therefore equipped with anatomical specimens, models, diagrams, lantern slides, and microscopes,

and a ward is arranged for instruction; there is a model operating theatre, a drill hall, models of railway and motor ambulance, stretchers, a kitchen equipped for instruction in cooking, a lecture hall and museum, and everything that can promote the teaching of first aid, home nursing, and hygiene on a practical and technical basis.

Wishing to test the feeling of the country in regard to a memorial on the lines proposed, a few members of the governing body sent out a strictly limited number of letters privately. The response was so immediate and unanimous that it was resolved to issue a public appeal. The intention is to secure a site and building for the establishment of a technical college at which our ambulance workers can be educated in a manner worthy of this important department of practical medicine and surgery. We have long been familiar with the great public work done voluntarily by the ambulance workers for the past forty years, and more recently in the war. There has been no opportunity given to the public to express their thankfulness to these men and women for their humane work. We want to see neither monuments in stone nor any other form of inanimate testimony, but an emblem in being, an active and living centre where ambulance teaching shall be furthered, standardized and perfected, to meet the needs of the injured, the sick, and the suffering.

Dr. ROBERT ANDERSON (Vice-President of the Section) said that he had been interested to hear Sir James Cantlie's account of the embryonic stage of civil ambulance. He himself well recalled it in the North of England. He gave his first course of lectures on ambulance in Northumberland in 1881, the very year of which Sir James had spoken. When he took up the subject he did not know how to lecture and had no textbook. He began in a colliery schoolroom with fifty or sixty men, moderately intelligent pitmen, but quite ignorant of this subject. He was not lecturing for their entertainment, and it was a rather ambiguous situation—an ignorant teacher addressing an ignorant class! The first book he had was Esmarch's book, translated by Princess Christian (*First Aid to the Injured: Five Ambulance Lectures.* Translated from the German. London, 1882.) With this very creditable production he proceeded to give lectures, and the pitmen crowded to them, because they understood that they would get information which would be of advantage and benefit to them and their fellows. Later on he was asked to give other courses of lectures, and the class was twice doubled. This went on session after session, until neighbouring collieries began to get infected with a desire for knowledge, and he found himself giving four or five courses of lectures, at a distance of three or four miles from his own house, every winter. Eventually he was asked to be examiner in the district, and in this way he travelled over a wide area. He found the President's well-known textbook most useful. It was simple, though the very simplicity of the whole thing made it difficult. Too often they pottered about over the great and serious things to no particular purpose, and overlooked the very simple things. Sir James Cantlie had rightly emphasized the value of extemporization. The late Hugh Boyle, once president of the Northumberland Miners' Association, was one of his own pupils and heard him lecture on fractures. On the following day, in the pit, the man next to Boyle sustained a bad fracture of the leg. Boyle immediately applied first aid, using oakum for padding the splints and tying them with tarry rope. The result was excellent. On another occasion he was lecturing on bleeding from veins; one of the men in the class was the very man who had sustained the fracture just mentioned, and about two o'clock in the morning that man's wife called his attention to the fact that a varicose vein in her leg had burst. The man did not rush off to the surgery. He did exactly what he had been told to do the night before. He stopped the immediate bleeding by pressure below the wound, only sending for the doctor when it was daylight. Sir James Cantlie had very properly emphasized the fact that the first half-hour after the injury was the time when skilled aid could be of most use. Pupils were taught to put the patient in a safe position and await the arrival of the doctor. There was every reason why a College of Ambulance should be established in a large and important mining centre such as Newcastle.

DISCUSSION ON AN X-RAY MOTOR AMBULANCE WAGON SERVICE FOR GREAT BRITAIN.

Sir JAMES CANTLIE next introduced a discussion on an *x*-ray motor ambulance service for Great Britain, illustrating his remarks by a map showing centres from which areas could be worked. The paper he read in this connexion was one which he had already presented to the Royal Society of Arts on April 20th, 1921, and which appeared in the *Journal* of that institution for May 13th. His suggestion was, in brief, that *x*-ray wagons, which had been found of such value in various seats of war, should be used in peace. He had himself initiated a test service in London and a radius of fifty miles around London; only a few days previously the wagon was sent to Boxhill to carry out radiography in the case of a patient who was not allowed to leave her room. The idea of an *x*-ray motor ambulance originated in a conversation between Major Robert Mitchell of the Regent Street Polytechnic, Dr. Robert Knox, and himself. Its realization was rendered possible by the acquisition of such an ambulance, which was built by the British Red Cross Society for use in Italy during the war, and was now available for civil work. The members of the Eccentric Club in London, whose hostel work during the war would live as a model of practical philanthropy, made a contribution sufficient to purchase the wagon, which was presented to the College of Ambulance; the British Red Cross Society, at the instigation of Sir Arthur Stanley, presented the *x*-ray equipment. The purpose of the wagon was to bring the *x* ray apparatus to the sick man instead of—often at the cost of great pain and discomfort—bringing the sick man to the *x*-ray apparatus. The wagon stood outside the house while the apparatus was carried within, a cable connecting it with the energy supply, which remained in the wagon. He hoped to see these wagons introduced all over England, so that there should be no place where a man could not have the *x*-ray apparatus brought to his bedside. The authorities of the College of Ambulance had been testing the possibilities of conveying the delicate apparatus about the country and its transport up narrow staircases and into small bedrooms.

He added that several doctors from towns outside London had seen him about this scheme, and they were already endeavouring to get *x*-ray motor ambulances to serve districts in Scotland and England for a radius of fifty miles or more around centres where such wagons might be housed. In this way a network of areas could be spread, covering all parts of the country, which could be served with the *x*-ray motor ambulance, to the benefit of the medical profession and the lessening of pain and suffering to patients. Meanwhile the College of Ambulance could send the wagon anywhere within fifty miles of London. The poor were served without charge, but those able to afford it were expected to pay a fee.

Dr. GEORGE LOCKE described the ambulance work done at Hastings, and the skilfully adapted motor ambulance which was the pride of the town and was frequently to be seen in the streets of London. He hoped to be able to do something in connexion with the scheme Sir James Cantlie had outlined. The difficulty was to obtain the means for developing the radiographic plates.

Dr. C. H. MILBURN (Ministry of Health, York) asked what was the cost of providing an *x* ray motor wagon, and what would be the cost of maintenance. He asked also with what feeling *x*-ray experts in the area which the *x*-ray wagon would serve would regard it. Were they likely to be favourable to its introduction, or would they feel that it was in any way trespassing upon their province? He imagined that the whole of the financial transactions would not be of the nature of outgo, but that fees would be received from well-to-do people for the use of the wagon. He quite realized that the idea was that this service should be for the benefit of those patients who could not be moved; but might not the service extend so as to cover other than these immobile cases? He asked whether the College of Ambulance, or the Joint Committee of the St. John and the Red Cross organizations would be responsible for administration and finance.

Sir James Cantlie said that he had proposed a society to deal with administration; he would like every county in England to form such a society. He could not at the moment furnish figures as to expenditure, but it would not be so high as some estimates might suggest, and, as Dr. Milburn had said, there would be receipts as well as expenditure.

STRETCHER SLIPS.

A demonstration of stretcher slips, the carrying of loaded stretchers on the shoulders, and the yoke slip, followed.

Sir James Cantlie pointed out that during the war the men, both of the British and the American armies, ceased to use the old-fashioned slings, which caused the bearer to bend his head and back, and were very easily thrown down and lost. The stretchers were then hoisted on to the bearers' shoulders, but that was an impossible position, because the wounded man's face could not be seen. Anything which prevented the worker from seeing all that was necessary in ambulance work must be abandoned. The carrying of the stretcher on the shoulders was very effective—for the kinematograph show; but it would be remembered that the American general, Stonewall Jackson, when being carried in that way, fell off, sustaining injuries from which he died a few days later. On one occasion, to enforce the lesson to his class, he had said that Stonewall Jackson fell from the stretcher and broke his neck, and this statement of his being reported in the newspapers, a lady rang him up next morning and complained that he had not been quite accurate with regard to her grand-uncle! His reply was: "Madam, I am a teacher first, and I tell the truth afterwards!"

Sir James then gave a demonstration of the ease with which the new yoke slip was adjusted, its strength, and the ready manner in which it might be attached to the bearer's coat so that it could never be lost. With the yoke slip, which was modelled on the lines of the farm worker's yoke, two women could carry a man on a stretcher, whereas without the yoke perhaps as many as six women would be required.

The brief discussion which followed was on ambulance in general, and not on this particular contrivance.

Dr. W. Nunan (Professor of Medical Jurisprudence and Toxicology, Grant Medical College, Bombay) gave an account of ambulance work in India, where, he said, those who were enthusiastic on this subject had to persevere against apathy; but something had been done during the past six years; in Bombay the Parsee and Hindu ambulance divisions during the first six months of the war handled practically ever sick and wounded soldier. He had suggested to the Indian Government that a rupee a day was a fair return for the work of these ambulance boys, but the Government would not agree, as the workers were not employed during the whole of their time, but offered a rupee for a full six-hour day. Even this concession, however, was found to be very unsatisfactory in practice, and worked unfairly against men who were called on at any moment to devote an hour or two to the work. Official recognition of ambulance work was absolutely necessary in India; if only it were forthcoming this volunteer work would get on much better. At the same time, from the technical point of view, good progress had been made. A large motor ambulance was now worked by volunteers in the streets of Bombay.

Captain J. T. Scott (Cooden Colliery) mentioned that he took his first-aid certificate in 1888, and had been an ambulance worker more or less ever since. He thought that there was not sufficient recognition given to the men who devoted their time to this fine and noble work; hundreds of accident cases passed through his hands, and he knew what devotion it demanded; ambulance workers did not get the encouragement that ought to be theirs, either from the Government or, in many cases, from the owners of the mine, the shipyard, or the dock, where the work was done. His own case was an exception, because he had had every encouragement from the colliery company at Cooden.

Dr. J. G. D. Cort (Whitburn) thanked Sir James Cantlie, and expressed his intention of doing his best to carry out the instructions received.

THOMSON'S MACHINE FOR ARMLESS MEN.

A demonstration was then given of the machine for armless men, which was invented during the war by Mr. George Thomson of Edinburgh. Mr. Thomson, who was a gasfitter by trade, and acquainted with mechanics, succeeded in producing a machine which enabled an armless man to carry out a whole series of useful manipulations.

The apparatus consisted of a small table at which the armless man was seated. Beneath the table were two rods, on the ends of which were metal pegs whereby the movements were made. The armless man, whose boots were removed, wore socks with a digitation between the big toe and the next, as in a hand-mitten with a separate thumb-piece. By placing in these clefts the pegs on the foot-rods he was able to make the necessary movements. The foot rods were attached to uprights which came over the side of the table opposite to that at which the man was sitting, and to these upright pieces the "arms" of the apparatus were attached, and projected towards the worker. Hinges and joints made the whole structure movable in almost every direction, and at the end of the arms there was a slot in which the various instruments employed for writing, eating, and so forth could be inserted and removed as required. These instruments were hung in a rack on the table.

The armless man whom Sir James Cantlie had brought with him then, with quite considerable facility, managed to consume food, using fork and knife and spoon, even delicately breaking the shell from an egg, also to light a cigarettee, write with a pen, turn over the leaves of a book, drive a nail into a piece of wood, and execute various other movements.

Sir James Cantlie added that the first regulation machine made was now deposited at the College of Ambulance for public inspection.

COLLIERY RESCUE WORK.

In the afternoon the Section met again at the Miners' Rescue Station, Scotswood Road, Newcastle, when an instructive demonstration of rescue work was given by Mr. F. P. Mills, M.I.M.E., F.S.I., chief officer of the Durham and Northumberland Collieries Fire and Rescue Brigade. A large number of visitors were received by Colonel W. C. Blackett, Chairman of the Brigade, who pointed out that the station dealt both with outbreaks of fire and with rescue and ambulance work. The brigade had four such stations, which covered a radius of about ten miles. Men from the collieries came there to learn how first aid might be rendered. Colonel Blackett pointed to the exhibits of various types of breathing appliances in connexion with which, he said, Mr. Mills had done so much valuable work. With regard to some of the more elaborate of these he expressed the view that they were best used as a last resort, for there were simpler methods which should first be tried.

Dr. Robert Anderson (Vice-President of the Section) said that it was vitally necessary that there should be such well-equipped stations ready to send men out to save life. He agreed that many of the appliances which were on view should only be used as a last resort, but there were occasions on which they might be of the greatest value.

Dr. H. L. Rutter (Honorary Secretary of the Section), in thanking Colonel Blackett and Mr. Mills, remarked that Sir James Cantlie greatly regretted that he could not stay for the demonstration.

The visitors were then taken over the station and inspected with interest many modern appliances, including the means of making liquid air, the provision for resuscitating men who had been overcome by foul air, and the use of canaries, which were taken on the engine and carried down the mine for the purpose of indicating foul gases. It was explained that the birds when affected were soon brought round by oxygen. Many questions were asked of Mr. Mills and the other guides, and a hearty vote of thanks was accorded to them at the close.

A CASE OF TRYPANOSOMIASIS TREATED BY INTRATHECAL SERUM.

BY

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IN view of our recent advocacy of the treatment of sleeping sickness by the injection of serum into the spinal canal, we wish to record the case of Mr. X. in fuller detail.

The first point of importance is the probable date of infection. As to this, Mr. X. lays stress on the fact that, to the best of his belief, he was bitten only once by a tsetse fly. This point is impressed on his memory, as he often remarked in jest that alcohol, if taken into the system systematically, would keep all insects away, and he would call attention to the fact that, owing to his unfailing regularity as regards his evening "peg," he had never been bitten by a tsetse fly. This period of immunity applies to the interval between April 8th and May 7th, 1920, when he was in the fly area. From the later date till about July 12th Mr. X. was not exposed to the risk of infection. He was again exposed between July 14th and 17th and bitten once, but he is convinced there was not more than one bite.

Taking this history as correct—and we have no reason whatever to doubt it—infection was caused by a single bite, and the incubation period was either approximately a fortnight or, alternatively, as long as eleven weeks.

On July 30th Mr. X. had an attack of what he believed to be malaria, which lasted till August 3rd, with a temperature of 102° to 103° F., but unaffected by quinine. Attacks of fever recurred on August 4th–5th, 10th–15th, and 24th–25th.

On August 24th his blood was examined by an Indian subassistant surgeon (there being no medical officer in the district), who sent the slide to headquarters, where the presence of trypanosomes was confirmed by three medical officers, including Dr. Duke, the Government Bacteriologist, who diagnosed *T. gambiense*.

Mr. X. was seen by one of us (C. H. M.) on September 24th, 1920. He was then suffering from malaise, distaste for food, vomiting, pains in the back, and a dull headache. His face was grey and drawn; his weight had decreased from his normal 13 st. odd to 11 st. 8 lb. He had no sleeplessness or sexual excitement, nor was any rash observed. He had one small gland at the base of the neck on the left side, but this was possibly septic in origin (from a carious tooth). The gland was too small to puncture, but the peripheral blood showed two or three trypanosomes in each field.

On September 24th 0.9 gram of neo-kharsivan was injected intravenously; half an hour later 20 c.cm. of blood were drawn off and allowed to stand in a sterile covered jar for twenty-four hours, by which time a solid clot had formed; 12 c.cm. clear blood serum were thus obtained.

On September 25th, after 15 c.cm. of cerebro-spinal fluid had been withdrawn by lumbar puncture, the 12 c.cm. of clear blood serum were injected into the spinal canal. From September 26th to 30th there was severe reaction with pyrexia (101° F.) and intense headache. Subsequently convalescence was rapid.

Mr. X. then proceeded to England, but on the journey was examined at Khartoum by Major W. E. Marshall, R.A.M.C. (November 2nd). No trypanosome was found microscopically in the blood, either fresh or stained; nevertheless animal inoculations yielded positive results, for Major Marshall's cabled report, which awaited the patient on his arrival in England (December 12th), stated that the inoculation of 1 c.cm. citrated blood into a monkey and ½ c.cm. into each of two rats resulted in one rat showing trypanosomes in its blood on November 30th, 1920, and reinoculation from this rat into another was again positive.

In spite of this report it was decided, in consultation with Dr. W. T. Prout, Medical Adviser to the Colonial Office (December, 1920), to give Mr. X. no further treatment of any kind, as clinically he was perfectly well and his weight had increased to 13 st.

The results of subsequent microscopical examinations and subinoculations of the blood and cerebro-spinal fluid carried out in the bacteriological department of Guy's Hospital by one of us (J. W. H. E.) are recorded in the accompanying table. In view of the negative result of inoculation of Mr. X.'s blood into the monkey and the positive result obtained upon the rat by Major Marshall, it seemed fair to infer that the particular strain of trypanosome concerned was more virulent for the latter animal than the former, therefore all our inoculation experiments were performed upon small rodents.

To summarize this report the original infection must have occurred not less than thirteen months ago (at the time of writing), and the single injection of salvarsanized serum was given eleven months ago; there has been no other treatment of any kind whatsoever. Clinically Mr. X. is and has been perfectly well ever since.

The reasons that led us to employ intrathecal medication in the treatment of sleeping sickness were based upon clinical observation upon the disease which suggested the theory[1] that definite antibodies — trypanolysins — are formed during the course of treatment. This assumption might be correlated with the statement of some observers that cases of the disease undergo spontaneous cure, and of others that either the natural resistance of the native is increasing, or that the virulence of the strain of trypanosome is undergoing progressive diminution. (Our own observations do not, however, lend support to either of these views.) Dr. Vasello, of the Uganda Medical Service, further considers that the formation of trypanolysin is a natural phenomenon and is cyclic in periodicity. Data bearing on these points are being collected, but much experimental work is needed before evidence necessary to support these contentions can be presented for criticism.

We would recall that much of Ehrlich's preliminary work on chemotherapy was concerned with the employment of arsenic compounds in experimental trypanosome infections, and the first great principle aimed at throughout his search for an effective agent against protozoal diseases was the complete sterilization of the tissues by a single

Examination of Patient. Date.	Material.	Microscopical Examination.	Result.	Experimental Animals Inoculated.	Method of Inoculation.	Killed.	*Post-mortem* Examination.
21.12.20	Blood	(*a*) Fresh (*b*) Stained	No trypanosomes detected (?) One degenerated trypanosome in eight slides	Guinea-pig	1 c.c. intraperitoneally	17.2.21	No evidence of trypanosome infection.
20.1.21	Cerebro-spinal fluid, centrifugalized	(*a*) Fresh (*b*) Stained	No leucocytes observed No trypanosomes detected	Rat 1 Rat 2	1 c.c. intraperitoneally 1 c.c. intraperitoneally	17.2.21	No evidence of trypanosome infection.
7.4.21	Blood	(*a*) Fresh (*b*) Stained	No trypanosomes detected	Rat 3 Rat 4 Mouse 1 Mouse 2 Mouse 3 Mouse 4 Mouse 5 Mouse 6	2 c.c. intraperitoneally 1 c.c. subcutaneously 0.5 c.c. subcutaneously 0.5 c.c. subcutaneously 0.5 c.c. subcutaneously 0.5 c.c. intraperitoneally 0.5 c.c. intraperitoneally 1 c.c. intraperitoneally	29.4.21	No evidence of trypanosome infection.
2.5.21	Cerebro-spinal fluid, centrifugalized	(*a*) Fresh (*b*) Stained	No leucocytes observed No trypanosomes detected	Rat 5 Rat 6 Rat 7 Mouse 7 Mouse 8	1 c.c. subcutaneously 1 c.c. intraperitoneally 1 c.c. intraperitoneally 0.5 c.c. intraperitoneally 0.5 c.c. intraperitoneally	18.7.21	No evidence of trypanosome infection.
7.7.21	Blood	(*a*) Fresh (*b*) Stained	No trypanosomes detected	Rat 8 Rat 9	2 c.c. intraperitoneally 2 c.c. intraperitoneally	9.7.21	No evidence of trypanosome infection.

massive injection. Practical clinical experience has shown that this result is, however, very rarely achieved; and in connexion with the commonest of protozoal infections—namely, syphilis—multiple doses and alternation of drugs has now become the accepted method of treatment.

Syphilis and trypanosomiasis present many points of similarity, particularly as regards treatment when the infection has involved the central nervous system, so that we are justified in applying the accumulated experience of the past eleven years in the treatment of syphilis to the problem of the treatment of sleeping sickness.

It is now a matter of common knowledge that the arsenic introduced into the circulation by the intravenous injection of salvarsan or neo-salvarsan is at its maximum concentration *during* the injection, and can only be detected, as such, in the blood for a few hours afterwards, and does not appear at all in the cerebro-spinal fluid. Given an otherwise healthy patient, arsenic derived from 914 is rapidly excreted, chiefly by the intestines and kidneys, and usually at the end of forty-eight hours is no longer to be detected by chemical analysis.

It has also been shown clinically that the serum from a salvarsanized patient possesses curative effects when injected into another case of syphilis, even when the blood is collected after a lapse of time that apparently ensures its freedom from arsenic,[2] although Ellis and Swift make it clear that *in vitro* the spirochaeticidal activity of the serum is in direct proportion to the intensity of the Abelin reaction.[3]

The hypothesis to be adduced from the foregoing observations is that a phenomenon analogous to that which takes place in bacterial infection occurs in protozoal diseases also; that is to say, definitely lytic antibodies are formed in the serum in consequence of the stimulus afforded by the dead spironemal protoplasm—a theory originally put forward by Ehrlich himself.[4] The acceptance of this hypothesis, together with the admitted impossibility of forcing arsenic into the spinal canal by way of the blood stream and the danger of introducing it directly into the subdural space, were probably the factors that decided Swift and Ellis[5] to resort to intrathecal injections of so-called "salvarsanized serum" in cases of tabes and other syphilitic infections of the central nervous system. This procedure was followed in a considerable number of cases by a definite measure of success,[6] depending, it is true, to a certain extent on the duration of the nerve lesions, although we personally have had some striking successes in distinctly late cases.

As invasion of the central nervous system is the rule in infection with the trypanosome, and as the date of this invasion in point of time from the original inoculation by the insect host is a variable and unpredictable quantity, we hold that it is essential to apply curative measures to this area, when infected, simultaneously with the attempt to sterilize the more immediately accessible tissues; and to apply identical measures with prophylactic intent, if happily infection of the central nervous system has not yet taken place, in order to prepare an antagonistic medium to await the advent of the trypanosome.

Communication of the details of this method to the Society of Tropical Medicine and Hygiene, although sympathetically received by those present, naturally evoked some criticism, and we fear that disregard of these comments may retard the progress of attempts to place the treatment of the disease on a sounder footing. The criticisms fall under two distinct headings, some being levelled against the particular case of Mr. X., others against the general principle involved. Under the first heading the suggestions made are:

1. That Mr. X. never had the disease. The positive finding of the trypanosomes on several occasions by five different observers, two of whom are expert protozoologists—namely, Dr. H. L. Duke and Major W. E. Marshall, R.A.M.C.—the successful inoculation of a rat with the trypanosome by the latter observer, and the reinoculation of a second rat from the first, renders comment under this heading unnecessary.

2. That the trypanosome which has caused the disease in Mr. X. (and also in the native cases we have recorded) is a strain of low virulence, and the resulting infection is one which requires little or no treatment. If this suggestion is maintained there appears no reason why the trypanosomes of different districts and villages, or even individuals, should not also be differentiated into strains of high virulence and low virulence, until in all cases that recover after treatment the infecting trypanosomes are described as practically non-virulent. In controverting this thesis we would quote one case treated as a control.[7] This was a native who received an intravenous injection of neo-kharsivan on August 3rd, 1920, but did not have intrathecal serum; he made no improvement, and living trypanosomes were found in his cerebro-spinal fluid at the end of October, when clinically he was rapidly going downhill. Further, several natives in whom trypanosomes were found to be present died during the course of the few weeks they were waiting for treatment. Again, in untreated cases numerous deaths are reported, and the number of deaths, compared with the percentage of infected cases found on examination of large numbers of the population, affords no indication that cases of sleeping sickness recover by natural means or that the trypanosome is of low virulence.

3. That the disease was cured simply by the antiparasitic action of the original intravenous dose of neokharsivan, without any trypanolysin formation. This is rendered unlikely by the fact that subinoculation was positive six weeks after the original injection of neokharsivan.

4. That the case is not cured and the disease is dormant. Time alone can confirm or confute this argument, but so far the clinical history is an excellent one; Mr. X., who was very ill, is in the best of health now, and so compares favourably with other cases treated by routine methods of intravenous injections only or various arsenic and antimony compounds.

5. That another case now in London treated by the intrathecal serum method has not improved. We are informed, however, that this patient had been previously treated with repeated doses of atoxyl and antimony tartrate, so that—assuming always that the technique was identical with ours—we are quite justified in suggesting that the previous drug treatment may have resulted in the formation of "fast" strains, or, alternatively, have prevented or affected the formation of trypanolysin, which may well be the curative factor.

Criticism under the second heading is more destructive and uncompromising, as it definitely states that the treatment is unsound and unjustifiable.

Clinical experience demonstrates the value of local treatment in dealing with infections of the central nervous system as conclusively as it proves the impossibility of influencing them by intravenous medication; anatomy and physiology supply the logical explanation, rendered even more obvious by a study of the morbid anatomy of trypanosomiasis cases; and we would again take the opportunity of declaring our conviction that, whilst intrathecal medication is essential in cases where the infection has reached the cerebro-spinal fluid, we are also satisfied that it should form an integral part of the routine treatment of early, and indeed of all, cases. From a recent German publication,[8] it appears that this line of treatment was adopted in the Cameroons in the treatment of sleeping sickness, though its exponent has relied upon the effect of direct medication by arsenic compounds, injecting intrathecally 0.04 gram of neo-salvarsan mixed with salvarsanized blood serum, a procedure which we regard as inadvisable on account of its inherent dangers, a point which Reichenow himself admits.

We venture to think that the result of our serum treatment in the case of Mr. X. detailed above, supported as it is by the eight cases of natives who remain well more than eighteen months after treatment by a single dose of serum (two of these after over two and a half years) establishes a case for immediate investigation of an extended character in those countries where the disease occurs, simultaneously with careful laboratory experiment and control both at home and in Africa. If further support of our attitude is needed it is provided by the fact that among a total of nearly eighty cases that we have treated, some have died of intercurrent disease, two have disappeared, and two advanced cases did not respond to treatment, but no case to our knowledge has relapsed. The cases have been followed up and examined at regular intervals, both clinically and by microscopical methods.

Such an investigation as we have in mind involves a clinical study and experimental research by a team unhampered by any routine or official duties, but devoting all its

energies to the elucidation of this problem. Moreover, as the mentality of the native precludes the possibility of accumulating the necessary material at a permanent base, the team would be essentially a roving body, well equipped in every way and furnished with a really efficient travelling laboratory; whilst its activities, including periodical examination of treated cases and the collection of statistics, would extend over a period of about three years.

The personnel would include probably two clinicians and two or three trained protozoologists, assisted by an adequate staff of assistants, and also one or more veterinary surgeons—since it is obvious that, if the method we have put forward fulfils our anticipations, it opens up the possibility that the treatment of the future will resolve itself into the simultaneous intravenous administration of arsenical compounds and the intrathecal injection of salvarsanized serum derived from the horse, ox, or other large animal already experimentally infected and treated.

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GLYCOSURIA OF MALARIAL ORIGIN.

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MALARIA may simulate very many internal diseases, but we are not aware of cases of malarial glycosuria and malarial diabetes having been placed on record; the following two cases may therefore be of some interest.

CASE I.

J. F. S., a demobilized soldier aged 32, was admitted to the Tropical Section of Orpington Hospital on April 13th, 1921, as a case of malaria. He had his first attack in August, 1916, when malignant tertian parasites were found; since then he had had numerous relapses. On admission the temperature was 98.8°, and the pulse 120; the patient was pale and tremulous; he stated that he had lost flesh and complained of great weakness. Physical examination of the chest revealed nothing worthy of note. The spleen was not palpable. No malarial parasites were present in the blood. Differential count: Polymorphonuclears 63, large mononuclears 9, lymphocytes 33, eosinophiles 1. In the faeces no cysts were found. The chemical analysis, kindly carried out by Dr. Lynch at the Central Chemical Laboratory, Ministry of Pensions, Chelsea, gave the following results:

Total solids, 22.1 per cent.

Fat	8.6	per cent.
Fatty acid	2.8	,,
Soaps (as fatty acid)	2.8	,,
Total	14.2	per cent.

The urine, specific gravity 1031, was slightly acid, the amount passed during twenty-four hours was only very slightly increased. It contained sugar 8.5 grams per litre, but no albumin. Acetone and diacetic acid were absent.

On April 14th the patient was placed on a fairly intensive quinine treatment (10 grains three times daily). The sugar present in the urine decreased rapidly after twelve days' treatment, but there was still a quantity sufficient to reduce Fehling's solution and to give phenyl-glucosazone crystals, though not enough to estimate. The patient was then given, in addition, a course of six injections of quinine hydrochloride intramuscularly of 15 grains each. On May 10th the quinine hydrochloride injections were discontinued, and quinidine was given in their place (30 grains daily).

The urine was examined again on May 13th, 16th, 17th, and 18th, and did not give any reduction of Fehling's solution, nor did it give phenyl-glucosazone crystals.

At no time was the patient put on antidiabetic diet, and there was no restriction of his carbohydrate intake. There can be little doubt, therefore, that the disappearance of the sugar was due to the administration of quinine.

When the patient was admitted to hospital he was feeling very weak, and complained of having lost a great deal of flesh. There was, however, no polyuria, no boulimia, no thirst. On May 20th, 1921, the general appearance of the patient had much improved, and he expressed himself as feeling better than he had done for years.

CASE II.

Mr. E. N., aged 44, married, with no family history of diabetes, consulted one of us in March this year. During the war he served in one of the allied armies, and in 1916 he contracted, while in the Balkans, a severe malarial infection; he had several relapses, the last being on December 19th, 1920. In January, 1921, he noticed that he was feeling more hungry and thirsty than usual, was passing much more urine than normal, and was losing flesh. He consulted a medical man, who found a fairly large amount of glucose in the urine (2 per cent.), and placed him on a very strict diet, which induced only a slight decrease in the amount of sugar present in the urine. When the patient consulted one of us in February the urine contained 1.5 per cent. of glucose; it was acid, specific gravity 1032, no albumin, and acetone and diacetic acid were absent. The amount of urine passed during the twenty-four hours averaged 6 pints.

The patient looked rather emaciated and very anaemic; the skin was of a pale, earthy colour, with patches of hyperpigmentation resembling chloasma, so often seen in cases of chronic malaria. His spleen was very slightly palpable and very hard. The examination of the blood did not show any malarial parasites, but there could not be any doubt clinically that he had chronic malaria, and the diagnosis was made of "diabetes in a malarial subject." He was advised to continue the strict diet he had been having for the glycosuria, and in addition to take 10 grains of quinine three times daily for his malaria. He came back three weeks later feeling much better; the enlargement of the spleen had disappeared, and—a most interesting feature—the amount of sugar had decreased enormously, being less than 0.1 per cent. We came to the conclusion that it might be a diabetes syndrome of malarial origin, and suggested to the patient that he should go back to ordinary diet but continue the quinine. He came to see us regularly once a week and the sugar did not increase; only a trace was present. During March the patient went to the South of Europe on business, and during all the time he was away (four weeks) did not take any quinine. He came back to this country in April, and three days after arrival, after playing golf in the rain, had a shivering fit, followed by very high fever, which ended in profuse sweating. The spleen again became palpable and hard, and examination of the blood showed the presence of a few rings of malignant tertian. The urine was examined after the temperature had come down to normal; it contained 1.2 per cent. of sugar. The patient was placed on an intensive quinine treatment by the mouth and intramuscular injections for six weeks without any dieting; not only did the symptoms of the chronic malarial infection disappear, but the urine became completely free from glucose, when examined by the usual methods of analysis (Fehling's, Nylander, phenyl-hydrazine, fermentation test).

CONCLUSION.

Our observations tend to show that there is a form of glycosuria of malarial origin, and that this condition may at times (Case No. 2) become so severe as to simulate true diabetes, the patient losing flesh, becoming very weak, complaining of thirst and hunger, and passing a large amount of saccharine urine. The glycosuria in our two cases was cured by the administration of quinine in full doses without any dietetic treatment.

SLOUGHING OF THE LOWER UTERINE SEGMENT FOLLOWING PLACENTA PRAEVIA: LAPAROTOMY: RECOVERY.

BY

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A MARRIED woman, aged 27, was admitted to Addenbrooke's Hospital on January 22nd, 1921. She had been delivered, on January 1st, of her second living child, but not without complications. Twenty-four hours previous to delivery she had a sudden severe haemorrhage and had called in her doctor, who, although he was unable definitely to diagnose placenta praevia, had strongly suspected it. He immediately ordered her to bed with instructions to remain there. She failed to carry out these orders, but remained up and did her work for the twenty-four hours previous to the birth of the child, suffering from no further haemorrhage. The delivery of the child was uncomplicated and occurred rapidly after two or three pains and before the arrival of her doctor. The placenta however was retained, and was removed digitally and without anaesthesia one hour later. It was found to be very adherent to the uterine wall.

All apparently went well during the first eight days of the puerperium, after which an irregular pyrexia developed. On January 16th (the fifteenth day of the puerperium) the patient had a severe haemorrhage, and this persisted on and off until she was urgently admitted to hospital. She had no vomiting, and complained of little or no pain. Constipation was present, but was corrected by purges and enemata. On the day preceding the haemorrhage she had had diarrhoea, which had been checked with paregoric, and ergot and nux vomica had previously been given her by mouth.

I saw her on January 22nd, at 10 p.m., when the history suggested the retention of some products of conception which had become septic. She was exceedingly anaemic, with a small running pulse of 120 per minute, and respirations 24 per minute. She was wasted, and stated her inability to take much nourishment. Although complaining of little or no pain, she had the "abdominal type" of facies. The abdomen was soft and moved well, but there was slight tenderness over the brim of the pelvis. On vaginal examination it was found that the uterus was not particularly enlarged or tender, but there was an offensive blood-stained discharge.

Operation.

Under anaesthesia I explored the uterus. The os readily admitted the examining finger, which, when passed within the uterine cavity, came upon a firm transverse ridge of tissue, which at first I thought was a fragment of placenta. (It afterwards proved to be the lower edge of the normal posterior uterine wall.) Immediately above and posterior to the internal os I was struck by the softness and lack of resistance of the tissues. With a pair of blunt ring forceps portions of soft and blackened tissue were removed, which were thought to be detritus from the placental site.

In the same situation some tissue was grasped in the forceps which did not come away. Suspecting the possibility of its being a loop of bowel, I drew it down as far and as carefully as possible, and by means of special illumination demonstrated that my suspicion was only too well founded. Fearing that I had perforated the uterus, and in spite of the patient's desperate condition, I decided that the only course was to explore from above and, if possible, to remove the uterus. I divided the parietes by the ordinary mesial incision, but found the peritoneum adherent to underlying structures. The adherent coils of intestine were carefully separated and a condition of firm plastic peritonitis was found gluing all structures to one another including uterus, appendages and bladder. On further separating the coils covering Douglas's pouch, I came down on a large collection of foul-smelling pus. This was sponged out and the coil of small intestine which had been seen *per vaginam* was drawn up. It was found to be firmly adherent at both ends deep down in the pelvis, and over an area measuring 3 in. by ¾ in. on the side opposite to the mesenteric attachment the serous coat was eroded away, leaving the submucous coat exposed. Owing to adhesions it was found impossible to resect this. The hole in the back of the lower uterine segment was explored and cleaned as much as possible, and the appendix, which was very oedematous and lying in the abscess cavity, was removed. Owing to the generalized adhesions in the pelvis (general peritonitis was absent) and the grave state of the patient nothing further was attempted. A large tube was passed down to the bottom of Douglas's pouch and the wound closed. A piece of thin-walled colotomy tubing was inserted *per vaginam*, through the os uteri. This was removed twelve hours later, having apparently not assisted drainage to any great extent.

After-History.

During the next twenty-four hours the patient held her own and complained of little pain. The temperature fell to normal and the pulse remained about 136 per minute. She was kept on brandy by the mouth and camphor subcutaneously, and managed to take slop food in the absence of vomiting.

Forty-eight hours after operation the temperature rose to 101°, and this nocturnal rise persisted till the fifth day, when the temperature rose to 103°. Douches of Dakin's solution were given night and morning, and the abdominal wound continued to drain freely, at first emitting foul material indistinguishable from faecal content.

On the third day, by means of calomel gr. ¼ given four-hourly, the bowels acted well and continued to do so regularly during her recovery. By the end of the second week the temperature had fallen almost to normal, the patient was taking her food well, and the abdominal wound was cleaning and tending to close. Vaginal discharge had almost ceased. At the end of the fifth week she was sent home, the abdominal wound having closed and the patient's condition being most satisfactory. Her doctor has now been to see her, two and a half months after operation, and reports that she is fairly well and has had no need to call him in.

The case would appear to be one of infection of the placental site, aided possibly by its low position in the uterus, followed by a gradual sloughing of the uterine wall at the placental site, and secondary haemorrhage therefrom. A coil of small intestine lying in Douglas's pouch became adherent and eroded, and the infection spreading produced pelvic peritonitis and pelvic abscess. Although the bacteriology of the case was not worked out, the strong presumption is that it was an infection by *B. coli communis*, and it is surprising that the patient withstood and survived a condition so desperate.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

ENCEPHALITIS LETHARGICA WITH SEVERE HICCOUGH AT THE ONSET.

A SINGLE man, aged 27, had, in the course of his business, to visit ships at the London Docks. On the morning of December 11th, 1920, he felt quite well; at mid-day, on his way home from the docks, hiccough began, and was so persistent that at the end of two hours he consulted a doctor. Dr. Frazer, who saw him at this time, writes that he had "severe hiccoughs and general malaise." He then began to vomit about every quarter of an hour. Hiccough and vomiting persisted till 4 the next morning (a period of sixteen hours) when he went to sleep. Both symptoms disappeared and have not recurred.

For the next twelve days he remained in bed; he had headache and felt feverish, but did not feel sleepy. He travelled to his home at Cardiff on December 23rd; seeing everything double. On that evening he was seen by Dr. Fiddian (to whose kindness I am indebted for the notes of his condition). He then had a temperature of 102° F., was very tremulous, and delirious at times. A few days later he imagined he was being kept confined in a cabin on board ship, and became so violent that he had to be placed under restraint. Three days later he was quiet and became very sleepy. I saw him on January 17th, 1921. He was then stuporous and complained of diplopia. His face showed the typical Parkinson's mask. There was no squint or nystagmus, the pupils were equal and reacted to light, and the fundi were normal. The limbs were rigid and coarse regular tremor of the left arm was present. The reflexes were normal, except that both abdominal reflexes were absent, and that left-sided extensor toe response was obtained by the methods of Oppenheim and Gordon, but not by stroking the sole of the foot, the latter producing flexion.

He gradually got better. At the beginning of April (three months after the onset) he noticed twitchings of the left shoulder which later spread to the right. These have persisted. The muscles involved are the trapezius, sterno-mastoid, latissimus dorsi and pectorals. The contractions are coarse, of regular rhythm (often synchronous with the pulse beats) about 70 to the minute. They are most liable to come on in the evening and keep him awake. They disappear during sleep, but are always present when he awakes in the morning. The left side is more affected than the right.

For some months he has had to use a magnifying glass for reading, but now (six months after onset) he can read Jaeger 2 and Jaeger 4, though only for a short time; the pupils respond only slightly to a bright light. Nystagmus is present. The reflexes have become normal, and the rigidity of face and limbs has disappeared. While quite clear mentally, there remains a certain intellectual stiffness.

Concurrent epidemics of hiccough and encephalitis lethargica have been reported during the last two years, in all parts of the world, and more especially in France. Sicard and Dufour[1] have published cases, connecting "epidemic hiccough" with encephalitis of the myoclonic type. The course of an attack of epidemic hiccough is usually as follows: After a prodromal period lasting three or four days, during which lassitude, headache, general pains and slight fever are present, severe hiccough appears. It may occur in "rhythmic crises," lasting fifteen to ninety minutes, with similar intervals of rest, or may be continuous. It usually lasts for two to four days, but may persist for ten. It may be complicated by bouts of vomiting. Spasms occur at the rate of six or eight to the minute. The onset and termination are usually sudden. It is reported as being common in males and rare in children.

Hiccough occurring as a prominent symptom has been described in connexion with outbreaks of influenza in this country; isolated cases of "spasmodic" hiccough have also been published,[2] but I do not know of any recorded case of severe hiccough of the epidemic type directly followed by undoubted encephalitis lethargica, as in the case here recorded. French authors have regarded these epidemics of hiccough as a mild form of the graver disease.

It may be objected that the small number of cases in which epidemics of hiccough and encephalitis lethargica have been clinically connected is no greater than can be

accounted for by coincidence. It is curious that hiccough has been chiefly observed in the myoclonic form of the disease—that is, where the clonic spasm of the diaphragm would be, *a priori*, most likely to occur. Economo and others[3] have described outbreaks of epidemic hiccough followed in about a month's time by the appearance of myoclonic encephalitis in the same district. If it were found that these cases of epidemic hiccough later developed any of the sequelae known to follow encephalitis, such as diplopia, inactive pupils, paralysis of accommodation, mental hebetude, insomnia, etc., and especially myoclonus, such a sequence would greatly strengthen the view here advanced.

On the whole the evidence seems to justify the conclusion that epidemic hiccough is a manifestation of encephalitis lethargica; they should therefore be notified, and should be treated like any other form of lethargic encephalitis, especially as regards rest and isolation.

No remedy has been found of any use in controlling the actual attack. As benzoyl benzoate has been found by Nacht[4] to be valuable in certain forms of persistent hiccough it would seem worth while to give it a trial.

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[1] *Medical Science—Abstracts and Reviews*, vol. iii, No. 5, p. 481. [2] BRITISH MEDICAL JOURNAL, 1921, i, 82. [3] BRITISH MEDICAL JOURNAL, EPITOME, May 8th, 1921, p. 86. [4] *Lancet*, September 4th, 1920, p. 512.

Reviews.

ASYLUM ADMINISTRATION.

FOR a period of about two years during the war Dr. MONTAGU LOMAX held the position of temporary assistant medical officer in two large county asylums, and in his volume, *The Experiences of an Asylum Doctor*,[1] he has recorded the impressions he gained of lunacy administration and of the treatment of the insane in this country. The picture of asylum life herein given is extremely depressing, and the book creates a most painful impression upon the mind of the reader. An asylum is depicted as a gloomy and often dilapidated barrack-like building, where the atmosphere is such that brightness, hope, enthusiasm, and devotion—qualities which should be conspicuous in any institution for the sick and which are essential for its well-being—are unable to flourish or survive. It is clear that this must be so if the author is accurately describing the conditions which exist when he writes (p. 54):

> "The thoughtful observer . . . no longer wonders at the attitude of chronic pessimism which characterizes asylum doctors, attendants, and patients alike; the profound melancholy and dreary hopelessness which impregnates like a miasma the general asylum atmosphere, and which presses so heavily upon all those who live within its walls."

It is evident that there must be something seriously wrong with a hospital in which the attitude of the staff and patients can be described in terms such as these; and as Dr. Lomax takes his readers through the various departments of the asylum and describes the methods of treatment—or the absence of treatment—a feeling of profound dissatisfaction with the system in vogue will inevitably be aroused. We can only briefly indicate some of the conditions upon which the author bases what is a very serious indictment of asylum administration.

The asylum buildings are described as comfortless, badly constructed, unhygienic, and totally unsuitable for their purpose; the wards are barely furnished, and in some instances are devoid of bookcases or any means of amusement; there are no proper facilities for hospital treatment; no operating theatre; only a few dirty and neglected surgical instruments; and a dearth of dressings and other necessary appliances. The patients, it is said, are badly fed, clad in a convict-like garb, dirty and unkempt; no overcoats are provided in wet or cold weather; no attempt is made to occupy, interest, or amuse; and exercise is confined to a prison-like yard. There is, the author asserts, no pretence to classify, and all kinds of cases are indiscriminately herded together without consideration of their feelings or individual needs; there is no systematic treatment and no attempt at cure; the asylum is only to restrain and detain, and restoration to mental health only occurs by accident. Active treatment is almost confined to the excessive use of sedatives, and refractory or excitable patients are punished by drastic purgation or seclusion in dark rooms. The staff are bored, indifferent, and uninterested—not actually cruel, but tactless and more or less callous.

This is Dr. Lomax's description of asylum life, and since the book is written for the information of the general public, it may well be asked if it is a tested description of the average mental hospital in this country. With a few exceptions Dr. Lomax evidently regards it as such, and he conveys the impression throughout his book that the account he gives is generally applicable. It would indeed be sad if the conditions such as the author depicts were usual in the English asylums. Such a view we cannot accept; to do so would involve, so we believe, a grave injustice to a large body of skilled and devoted asylum workers. There are a large number of asylums in which the conditions as described above do not exist; where the nursing is of a high standard, tuberculous cases are isolated, operations are performed by consulting surgeons, the medical staff are in constant consultation together, occupation is systematically encouraged as a form of therapy, the patients are warmly clad (with overcoats), amusements are organized, the staff are keen, hopeful, and enthusiastic, and the aims are to cure recoverable cases and to make the life of the patients as a whole as happy as possible. Many statements which Dr. Lomax makes will be read with great surprise by those associated with asylums. As, for instance, that letters received by patients are read by anyone but themselves, and that the medical staff are not accustomed to interview their patients in private. In many asylums it is customary to study the patients and to hear their troubles quite alone, with no one but the doctor to hear what they have to say. For this reason a woman doctor is almost essential in a large asylum; development along this line might well become more general.

We have felt constrained to combat the view that conditions such as Dr. Lomax describes are in any sense general in asylums, and we feel that it is essential that the public should realize that there is another and brighter side to asylum life with which the author is apparently unacquainted. There is, however, no room for complacency, and we agree with Dr. Lomax that the asylum system is sadly in need of reform. The huge, cheerless, and cumbersome barrack asylums, such as the author depicts, are perhaps symbolic of the system of lunacy administration which has gradually evolved. The machinery is rusty and antiquated—unsuited to modern needs and aspirations. Dr. Lomax devotes much attention to the question of reform, and suggests directions in which they might be undertaken. The majority have been advocated by the Medico-Psychological Association, and a considerable number have been in operation in various asylums for a number of years. On many minor points relating to the comfort of the patients Dr. Lomax has useful suggestions to offer, and with his ideal of a village asylum we are in entire agreement.

The author has written a clear and particularly frank account of his experiences, and his book will certainly arouse public interest, and probably become the subject of further inquiry. It should not be possible for the conditions described in this book to develop in any institution for the sick, and it may be, as Dr. Lomax says, that the fault is not so much with those who administer the asylums as it is with the system they are called upon to administer. Whether the account presented by the author is overdrawn, or whether he has sufficiently taken into account the conditions created by the war, we cannot presume to decide, but it is perhaps true to say that the more public attention is drawn to asylums, even if an antagonistic attitude is shown, the better it will ultimately be for those institutions.

The want of public interest is perhaps the greatest difficulty with which the mental hospitals have to contend. They are out of contact with the community; they tend to be "last resorts"; and they do not fulfil as completely as they might those social functions for which, in many instances, they are admirably designed. They need to be in vital touch with social organizations, visited more,

[1] *The Experiences of an Asylum Doctor*. With Suggestions for Asylum and Lunacy Law Reform. By M. Lomax, M.R.C.S. London: G. Allen and Unwin, Ltd. 1921. (Demy 8vo, pp. 255. 12s. 6d. net.)

humanized by contact with life outside, and above all freely open to members of the medical profession to visit their cases and discuss them with the asylum doctors. The public need to be enlightened, not only in respect to abuses which may exist, but equally so in respect to the aims, needs, aspirations, difficulties, and work accomplished in hospitals for the mentally sick. If this book serves to interest the public and induces them to press for much-needed lunacy legislation, and to adopt a more liberal policy in respect to the treatment of the insane, it will have served a useful purpose. We are sure that this is the result Dr. Lomax is anxious for his book to achieve. There is, however, a danger that it may be utilized to make an indiscriminating attack on asylum management, and thus blind the public to a great deal of unobtrusive work which is being, and has been, done on behalf of the insane in this country.

KEITH'S EMBRYOLOGY.

STRIKING as were the advances made in all branches of biological inquiry during the nineteenth century, in few were the advances more marked than in embryology. The way had been shown in the two previous centuries, but little progress made along it, and it was mainly the researches of Von Baer and His in the nineteenth century which led to the systematic exploration of the new country. In 1827 Von Baer demonstrated for the first time the extremely small mammalian ovum, and in 1870 His described a microtome which corresponded in principle to that in use at the present day. In the half-century which has passed since His showed us what could be done with a complete series of sections of a young embryo, a vast field of knowledge has been added to the subject of anatomy.

Doubtless, to begin with, the tendency was to regard embryology too much as a pure science, and to treat it as a special subject. The facts alone appeared cold, barren, and meaningless. No one has realized this more clearly than Sir ARTHUR KEITH, whose well known work on *Human Embryology and Morphology*,[2] has now reached a fourth edition. In the original conception of the book the author sought to bring the facts of embryology into line with those of comparative anatomy and physiology, and to interpret them in the light of our knowledge of the evolution of the human body. Nor was the bearing of the facts on medicine and surgery forgotten. The book was an instantaneous success. It appealed not only to students, but also to teachers and medical practitioners, and in each succeeding edition it has continued its successful career.

The issue of the present edition has given the author the opportunity not only of incorporating much new work in the field of embryology, but also of rearranging and to a large extent rewriting some of the chapters. Over eighty new illustrations have been added. This has entailed some increase in the size of the book, but in making it thoroughly representative of the latest British and American research Sir Arthur Keith has greatly increased its usefulness, and at the same time it is still well within the compass of the average reader.

Every medical student should read this textbook in his second year, and if he can do so in a museum with some embryological models in front of him, so much the better.

"PSYCHE."

THE current number of the new series of the review *Psyche*[3] is catholic in its appeal. There is an interesting series of topics of wide diversity. The policy of the review is "to provide a conspectus of all the most reliable views of modern psychology," although not necessarily discarding the more conjectural, and to judge by this number, the policy bids fair to be carried to success.

In a closely reasoned study of the criterion of criminal responsibility in insanity Dr. Prideaux is optimistic enough to look forward to a future when "moral responsibility" and "legal responsibility" will be coincident—a future when "responsibility tests" will be our main reliance in ascertaining criminal liability. From this happy consummation we are admittedly far removed. Meanwhile there remains the necessity of bringing about some reconciliation between the opposing schools, some compromise calculated to remove the instances, now happily infrequent, of injustice ensuing under the application of the criterion set up in the McNaghten case. The suggestion that this could be best effected by raising the question of insanity as a defence only in a trial subsequent to one recording a conviction—and then before a judge and medical assessors—is open to doubt. Reconciliation may be sought in two other ways—by the establishment of a permanent professional body of psychiatrists instructed and called by the court as witnesses, and by the reversal of the presumption of knowledge on the part of one already accepted as insane, so that, as Oppenheimer suggests, those proved to be of unsound mind should be assumed, until the contrary be proved, not to know the nature and quality of their act and that what they were doing was wrong. In the peculiarly difficult path he has chosen to tread Dr. Prideaux only once stumbles. "Theoretically then," he says, "both medicine and law are in a state of ignorance as to the criterion to be applied as a test for insanity, but whereas the law demands that there must be some hard-and-fast rule, medicine replies that theoretically no sharp line can be drawn between the sane and the insane." The law, however, does not concern itself with the criterion of insanity. It is concerned with the question of responsibility and with that question alone. The criterion of insanity—such as it is—is the province of medical men, and will remain so until a state of insanity necessarily entails a state of irresponsibility.

Amongst other contributions there is a unique account by Major Priestley of the effect of Antarctic rigours on the minds of his fellow explorers. Richards and Ogden, in a brief article, clarify the obscurities of modern psychological terminology. Mr. Dingwall refutes the psycho-analytic interpretation of psychical phenomena, and reserves some venom for the hostile scientist "untrained in psychical investigation."

NOTES ON BOOKS.

IN *V.R. 76: A French Military Hospital*,[4] Mr. HAROLD J. RECKITT gives an account of a hospital founded by himself and Lady Johnstone, wife of the British Minister at the Hague, and established at the village of Ris-Orangis on the road from Paris to Fontainebleau. The book is a chatty account of the administration by a lay Englishman of a hospital recognized by the French military authorities and supported and staffed to some extent by Americans. Consequently it is not to be expected that the record should contain much that is of medical or surgical interest, beyond a summary of the cases treated. The difficulties experienced in establishing and developing a small hospital amongst the French were not unlike those sometimes encountered in our own country. After months of discussion permission was given for the establishment of the hospital; but when the personnel had been got together it was discovered that the hospital buildings would not be ready for three months! Even when the hospital was ultimately absorbed by the American Red Cross, the rules with regard to finance made administration extremely difficult. Sundry criticisms due to the different conditions of different countries had to be met. Thus the French wounded, accustomed to see Frenchmen of 48 years of age in the fighting line, began at one time to describe English orderlies of 40 as *embusqués*. At other times difficulties in discipline arose; and this was not surprising in a French military hospital with a non-medical administration, to which was attached an American surgeon of distinguished position who, not being a French officer, could not be recognized by the French Government as solely responsible for the institution. It says much for the tactfulness of Mr. Reckitt that for three and a half years he was able to steer his hospital through the dangers of such a position. In Dr. Joseph A. Blake of New York Mr. Reckitt obtained an admirable *médecin chef*, who did much to establish the reputation of the hospital. The latter half of the book consists of notes and reminiscences by various members of the staff, and the whole has been arranged and edited by Miss Margaret Storrs Turner.

[2] *Human Embryology and Morphology*. By Sir Arthur Keith, M.D., F.R.S., etc. Fourth edition, revised and enlarged. London: Edward Arnold. 1921. (Med. 8vo, pp. 498; 490 figures. 30s. net.)

[3] London: Kegan Paul, Trench, Trubner and Co. Issued quarterly. Price 5s. net.

[4] *V.R. 76: A French Military Hospital*. A History of the Foundation Johnstone-Reckitt. By Harold J. Reckitt. Arranged and edited by Margaret Storrs Turner. London: W. Heinemann, 1921. (Demy 8vo, pp. 303; illustrated. 21s.)

British Medical Journal.

SATURDAY, AUGUST 20TH, 1921.

THE DANGERS OF RADIATION.

THE two matters which have recently most occupied the minds of radiologists were both discussed in the Section of Radiology and Electro-therapeutics at the annual meeting of the British Medical Association at Newcastle: the one is the method of *x*-ray therapy brought prominently to notice by the claims made by the Erlangen school; the other the hitherto not fully recognized dangers to radium and *x*-ray workers. Possibly the former has in some measure been responsible for the full realization of the latter.

For a few years past a certain school of radiographers has been calling for more powerful apparatus, for the production of the highly penetrating type of *x* rays in larger quantities, and for the use of massive doses in the treatment of various diseases; the culminating point of all this is for the present the German technique. A machine capable of yielding 200,000 volts and a tube which will pass for hours a current backing up a 16-in. spark gap at 2 to 2.5 milliampères are asked for. Drs. Seitz and Wintz claim that they have worked out with such an apparatus the definite dose of *x* rays which should be administered at a single sitting in cases of malignant disease, and which so administered will "kill" the malignant cell. This contention, if true—and at the present time this "if" is all-important—would mark a very long step forward in scientific treatment from the hitherto more or less happy-go-lucky dosage which has been administered in an empirical manner. Whether these German workers will or will not eventually be proved to have established their points as to the definite dose and the single sitting, they at any rate have pursued their investigations upon thoroughly sound and scientific principles.

At the recent meeting at Newcastle Dr. Knox, the President of the Section, in discussing the intensive treatment of cancer, spoke of the need for the careful study of the effect on the blood, not only as regards variation in the proportion of the different corpuscles, but also as to any effects on the corpuscles themselves and on the serum; the decision of questions as to the protection of workers is, as he pointed out, intimately associated with what is already known about these blood changes.

During the past few years Sidney Russ, Mottram, Lazarus-Barlow, and others have made careful investigations of the blood of workers with both radium and *x* rays; they have as a rule dealt chiefly with the differential counts; and in the discussion reported elsewhere in this issue Russ related his recent experience with regard to the circulating leucocytes of rats; he found that while the effects on the lymphocytes are regular and can be repeated, similar observations on the polynuclear leucocytes show irregular changes, varying in different experiments. The important conclusion was that experimental and observational data both tend to prove that both *x* rays and gamma rays may be expected to cause lymphocytes to disappear from the circulation. Further, his and Mottram's experiments show that red cells, though not so sensitive, are also affected by the same radiations. Russ and others have also stated that in the course of their researches upon the circulating blood of rats small doses of *x* rays, so small that they produced no visible photographic action on photographic plates, were nevertheless capable of producing definite blood changes in rats. This observation will require confirmation, but if it prove to be correct it may have an important bearing on protection.

In the opening paper of the discussion on radiations in the treatment of diseases of the blood Gulland, as will be seen, entered fully into the different forms of anaemias in which *x* rays or radium are either indicated or contraindicated; he considers that the condition which gives the most favourable results from radiation is chronic myelocythaemia; in its treatment he favours radium rather than *x* rays. He suggests that the reason why the myelocythaemias are so much more amenable to radiations than the myeloblastaemias is that the cells affected are of a more highly differentiated type, approximating more nearly to a benign tumour.

In relation to the modern trend in favour of intensive *x*-ray treatment it is to be noted that it was asserted during the discussion that the dosage must be massive, as powerful indeed as the superficial tissues will stand, that it must be given at long intervals, and that frequent and small doses only stimulate the abnormal condition. These statements are open to question. In the past it has frequently been noticed that the spleen diminishes rapidly in size, and that the blood count quickly improves and even becomes normal under small and frequently repeated fractional doses, with very small currents passing through the tube. This method avoids all the unpleasant effects so often produced upon patients by massive doses, and is not lightly to be set aside. The statement that these small doses stimulate the lesion has not been proved; we know, indeed, of no evidence in its favour.

All these researches on the blood, the known action of *x* rays and radium on certain blood diseases, the tragic death of Ironside Bruce, the ill effects on many workers in radium and *x*-ray departments, have accentuated the dangers and have forced the question of protection into prominence. If in future the *x*-ray treatment of malignant disease is to be carried out with *x* rays of the highest penetrating powers, methods of work and methods of protection will have, of necessity, to be carefully overhauled with the view of making them more efficient. Those protective measures which were considered necessary and effectual under the older methods of *x*-ray work have completely broken down under the newer conditions, and both in private clinics and in hospitals many modifications will have to be made. In the past two main lines of protection for *x*-ray workers have been in vogue; the tube was enclosed in materials as opaque as possible to *x* rays, and material opaque to *x* rays was worn by the operators in the shape of gloves, aprons, and so on. These means have probably, when properly carried out, been fairly efficient as regards the direct effects of *x* rays upon the blood; but measures of this kind will not suffice with modern apparatus. Fortunately the protection for workers whilst carrying out *x*-ray treatment can be made absolutely efficient by the most simple means. The fundamental point is that no one should be in the same room with the patient whilst the massive doses of highly penetrating rays are being administered. If the patient is placed in a cubicle or room the walls of which have been

rendered opaque to x rays by lead or some other suitable material, then the apparatus, or at any rate the part by which it is controlled, can be outside this cubicle with the operator, and the treatment can be watched through a small lead glass window placed on a part of the wall on which the smallest possible quantity of radiations will impinge. Such an arrangement will mean that the operator is not exposed to the rays at all, and then no further protection is necessary. An additional precaution would be that the opening of the door to gain access to the treatment room should cut off the current.

When protection has to be made efficient for the purpose of making screen examinations and the usual routine work of x-ray diagnosis the matter is not so simple, especially as regards the former; but it is fortunate that only comparatively small currents are required for screen work, and so even here protection does not present insuperable difficulties. For the actual exposure of plates it is of interest to recall the fact that even in the very early days of x-ray work the late Professor Albers-Schoenburg of Hamburg had a small x-ray proof cubicle in the middle of his operating room, all the control apparatus was placed inside this; all the plate taking was done with the operator inside, and he was able to view the patient and tube through lead-glass windows.

As the effects of the high penetrating x rays and the gamma rays of radium are identical, it follows that protection for radium workers is equally important, and generally speaking the principles upon which it is to be carried out will be the same, modifications being made to suit the special requirements of radium.

There are many other practical details which still require consideration in order that workers may be thoroughly protected; among these are the suitability of rooms as regards size, ventilation, and the access of fresh air, the hours of work, sufficient holidays, and so on; but granted all the dangers and all the difficulties, there appears to be no reason why x-ray work at any rate, should not with care be made perfectly safe for both operators and patients.

A RETROSPECT OF NATIONAL INSURANCE.

For some time past there has been a widely expressed demand for a reliable description of the medical service under the National Insurance Acts. The need for this has been specially felt in America, which before long will have to make up its mind as to whether it will establish some form of national insurance or State medical service. Criticisms of the British system have appeared both in England and America, some of them displaying a lamentable ignorance of the facts and some so tainted with political prejudices as to be worse than worthless. The task of compiling such a description as is wanted is far more difficult than might appear at first, but no one could be in a better position to undertake it than the Medical Secretary of the British Medical Association. In addition to his personal acquaintance with general practice, Dr. Alfred Cox has been, from the time when the idea of national insurance was first taken up, intimately associated with all the discussions within the medical profession and the conferences with the Government. It has been his chief business to study every suggestion made, to focus the opinions of the profession, and to gather from every quarter trustworthy information as to the practical working of the medical service. Any statement, then, of fact or opinion coming from him may be taken as authoritative, and the series of articles he has contributed recently to the *Journal of the American Medical Association* may be confidently recommended as a thoroughly reliable summary of the facts up to date.*

The subject matter of the articles may be divided into two parts: First, a description of the insurance medical service, with its principal regulations now in operation; and secondly, a historical retrospect of the development of the system, the whole being freely interspersed with comments and criticisms. It is unnecessary here to deal with the descriptive part, which may be accepted as accurate and trustworthy, and the only comment that suggests itself for American purposes is that, while the account given of the local administration of the service is fairly full, more space might profitably have been allotted to the central administration.

In his historical retrospect Dr. Cox must have felt that he was treading on very thorny ground. The lay press generally and the friendly societies considered that in the negotiations with the Government the British Medical Association gained a remarkable victory. On the other hand, a section of the medical profession maintained that the Association was signally defeated, and, as appears to have become the fashion in the trade unions, the leaders and delegates were unreasonably abused because everything that extremists demanded was not obtained. In this connexion Dr. Cox aptly quotes the *Westminster Gazette*, which said: "We all admire a man who does not know when he is beaten; the trouble about the British Medical Association is that it does not know when it has won." It is clear throughout the articles that Dr. Cox strongly resents the attacks on the British Medical Association by members of the profession, and he shows a pugnaciousness which is, perhaps, in some danger of becoming infectious and of rousing the war spirit when there ought to be peace. In his short section headed "Lessons to be drawn from the fight" several matters are again brought to light which might well have been consigned to oblivion. We feel confident that Dr. Cox will take this criticism in the friendly spirit which dictates it. His loyalty to the Association and his self-sacrificing devotion to the best interests of the profession are too well known to be in question, but in raking up the ashes of the past, which may still be smouldering beneath, there is some risk of again fanning them into a flame, which is, of course, far from his intention.

In the chapter describing the outlines of the system as at present constituted reference is made as occasion offers to its defects and faults; without setting up as a general apologist, Dr. Cox shows himself ready to accept reasonable excuses for defects. For example, the fact that the service is almost confined to general practitioner treatment is excused on financial grounds. Mr. Lloyd George, from the very outset, was never tired of saying that the medical service was not a State service and not a charity, and that, save for the fact that the State was willing to offer a strictly limited subsidy, the system must be regarded as a "business proposition"; as such the contributions must be commensurate with the benefits, so that if an extended service be demanded the contributions of employers and employees must be proportionately raised, and against this there would be great objections. How far this should be accepted as satisfactory

* *Seven Years of National Health Insurance in England. A Retrospect.* By Alfred Cox, M.B., B.S.Durh., Medical Secretary of the British Medical Association. (*The Journal of the American Medical Association.*)

and how far the State should divest itself of responsibility is of course a question still open to debate.

The disciplinary powers of the Medical Services Subcommittees are dealt with in a reasonable manner. "It is," Dr. Cox writes, "a fact not foreseen by many of us in the earlier days when we viewed the setting up of these committees with great suspicion that the medical members of the subcommittees are notoriously much harder on medical delinquents than the lay members are. . . . The number of doctors actually struck off the list is very small, and there has been no case in which the penalty has not been felt by all who knew the circumstances to be deserved." The duties of the Panel Committees in regard to excessive prescribing are fully explained; Dr. Cox does not believe that "the procedure has deprived or will deprive a single insured person of any drugs really necessary for his treatment; but the system evidently does not favour 'elegant pharmacy' or luxury in prescribing." This, no doubt, is as it ought to be, though it has offered an opportunity to some opponents of the system to allege that the drugs supplied are only the cheap and nasty ones.

Dealing with "The Effects of the System," Dr. Cox concludes that it has increased the work of the doctor, and particularly his clerical work, but that it has undoubtedly increased the income of the profession as a whole. In this connexion he is very severe on certain sections of the lay press for fostering the idea, which some doctors also have been willing to spread, "that the system is a very cheap and inferior service, given by unwilling and badly paid doctors to persons who get it as a kind of charity. This kind of thing has rebounded with great severity on the medical profession. It gives a handle still to our Yellow Press and to persons like your Mr. ——, who came over here with the intention of finding out what a bad service it is, and had no difficulty in finding plenty of people to fill him up with the kind of thing he was looking for. Let it be clearly understood that there is no charity about this service." Our readers will probably at once identify the Mr. —— referred to; and we have no doubt that the American medical profession and American statesmen will quickly decide which are the more to be depended on, the semipolitical conclusions of Mr. ——, founded on statements by avowed opponents of the system, or the well informed conclusions of Dr. Cox, founded on practical acquaintance with the whole of the system.

The effect on the professional moral of the doctors is dealt with in a very cautious way, for it is admitted to be too early to arrive at any conclusion. One thing Dr. Cox says is clear: that "the profession which people had vaguely thought lived mainly on its reputation as a 'noble profession' and on the gratitude of the people who could not pay has been discovered to be as amenable to ordinary economic laws as anyone else." Does not this mean, in other words, that the moral has been not so much altered as revealed? "The doctors have had to talk more in public about money, which has had a bad effect on their status in the public eye." Dr. Cox thinks this is only a temporary effect, and that the influence of the system on the moral of the profession will on the whole be good.

As one of the chief disadvantages of the system is mentioned the fact that it "has rendered the profession much more liable to be used as a pawn in the political game." Grumbles have been seized on to discredit not only the system but the Government, and many doctors with an honest grievance have not seen through the political game. Dr. Cox has quite rightly tried to open the eyes of the profession to the discreditable use that may be made of perfectly honest complaints, but surely in this there is nothing special or peculiar to the National Insurance system. Every social movement has been used and will be used by the Opposition press as a stick with which to beat any Government that happens to be in power. The public sooner or later come to understand the position, and Dr. Cox's remarks on this are only apposite to the Insurance Act in so far as they are a warning to medical men. Without saying that the majority of the doctors are entirely satisfied with the system, Dr. Cox states confidently that "not one doctor in 1,000 who is doing National Health Insurance work would willingly go back to the old system."

After dealing, perhaps rather too briefly, with objections and desirable modifications of the medical system on the lines already suggested by the British Medical Association, Dr. Cox concludes that one of the chief lessons the Insurance Acts have taught the profession is that a strong and vigilant fighting organization is as essential to the medical profession as to every other calling or trade. There can be little doubt that some of his statements and opinions will have exposed him to sharp criticism from certain quarters, but it may safely be said that his views are supported by the majority of the profession, and this, with the fact that they are backed by a knowledge and experience second to none, should go far towards commending them to the American profession.

ZYMOTIC DIARRHOEA AND EARTH TEMPERATURE.

THE observation of Ballard that the rise in mortality from summer diarrhoea does not commence until the temperature of the earth, as recorded by the 4 ft. earth thermometer, has reached 56° F. or thereabout, is strikingly illustrated in the course of that disease during the present summer. That high atmospheric temperatures were associated with the prevalence of zymotic diarrhoea was a matter of common knowledge, but Ballard showed that no matter what the atmospheric temperature or that of the superficial layers of the earth might be, they had no influence on the course of epidemic diarrhoea until the temperature of 56° F. was recorded by the 4 ft. earth thermometer. Warm and dry weather undoubtedly favour the epidemicity of diarrhoea, but only after this critical temperature has been attained. Warm and dry weather, prolonged and persistent, in winter, spring and summer we have had, but the weekly record of deaths issued by the Registrar-General showed no increase from diarrhoeal diseases. For the week ending July 9th the mean temperature of the 4 ft. earth thermometer at Greenwich was given as 55.9°. The deaths under 2 years of age for that week from diarrhoea were for the ninety-six great towns 64 and for London 13, the corresponding mean weekly deaths for the thirteen preceding weeks 56 and 12 respectively. For the following week the mean temperature of the 4 ft. earth thermometer was 57.3 and the infantile diarrhoea deaths jumped in the ninety-six great towns to 118 and in London to 30. A week later the figures were: 4 ft. earth thermometer 58.5° F.; diarrhoea deaths under 2—ninety-six great towns 198, London 29. For the week ending July 30th the figures were: 4 ft. earth thermometer 59.6°; corresponding deaths from diarrhoea—ninety-six great towns 300, London 52. The figures are not high but they are telling. Perhaps there is no instance in the behaviour of disease of a definitely measured telluric condition correlated with a vital phenomenon so striking as is this rise in the deaths from infantile diarrhoea when the temperature of the earth 4 ft. below the surface reaches the critical level. The chain of events connecting these correlated phenomena is unknown. Infants exclusively breast-fed are but little if at all subject to zymotic diarrhoea. There is much

evidence to show that contaminated milk artificially fed to young children is a high correlate in the development of the disease. The prevalence of flies is another, but epidemicity is established only when the earth temperature conforms to a narrow rule. The signal is one for redoubled vigilance by those responsible for the public measures taken to safeguard infant life and health. To the practitioner, the family guide and guardian in these matters, it has a significance the less likely to be overlooked because he appreciates more fully the precise and particular bearing of this specific physical event. It behoves everyone to remember that while the 4 ft. earth temperature remains above 56°, zymotic diarrhoea threatens the infant population living under those other conditions that subject it to the incidence of the disease.

OUTBREAKS OF FOOD POISONING.

The investigation of outbreaks of food poisoning or of individual cases of illness alleged to be due to the contamination of food has admittedly in the past frequenty been of a very casual and unsatisfactory character. Too often it has been confined to an inquiry by a coroner and a jury who may have had before them quite insufficient medical evidence to justify the conclusions arrived at. It follows, therefore, that many opportunities must have been lost of amending conditions associated with our food supplies which are detrimental to the public health. The Ministry of Health has long been alive to the danger resulting from the lack of organized investigation of those conditions, and the resources of the central health department have always been at the service of medical officers of health who have been called upon to make inquiries in connexion with these outbreaks, but it is only in recent years that precise instructions have been issued as to the steps that should be taken on the occurrence of a case of illness suspected of being due to food poisoning. In January last, as was noted in our columns at the time, a memorandum was issued by the Ministry requesting all medical officers of health to let the Ministry know immediately of any such case, giving information as to the chief causes of food poisoning, and indicating the best method of investigating the circumstances connected with a case. A further memorandum has now been issued by the Ministry stating that arrangements have been made in conjunction with the Medical Research Council for the fuller investigation of these cases. Dr. A. W. J. MacFadden, senior medical officer of the Foods section of the Ministry, will have charge of these inquiries, but the laboratory work and the investigations connected with it will be carried out in the Pathological Department of the University of Bristol by Dr. W. G. Savage, county medical officer of Somerset, whose recent report to the Canned Food Committee of the Department of Scientific and Industrial Research, Food Investigation Board, based on experimental investigations spread over several years, throws much light upon the causes of food poisoning. The Ministry urges upon medical officers of health to make the fullest use of the arrangements made with the University of Bristol, and those who do so will be greatly assisted by a memorandum drawn up by Dr. Savage, in which he describes the methods to be adopted in collecting and transmitting material for examination. It may be anticipated that the action of the Ministry of Health in providing, at no cost to local authorities, these facilities for the speedy investigations of circumstances which have hitherto given medical officers of health a great deal of anxiety, will enable the latter to deal with outbreaks of food poisoning much more successfully than has hitherto been the case.

THE BRITISH ASSOCIATION AT EDINBURGH.

The eighty-ninth annual meeting of the British Association will begin at Edinburgh on Wednesday, September 7th; the president, Sir Edward Thorpe, C.B., F.R.S., will deliver an address on "Some aspects and problems of post-war science, pure and applied." The sections, of which there are thirteen, begin their work on the following morning. In the section of Physiology the president, Sir Walter Fletcher, K.B.E., F.R.S., M.D., will give an address on the boundaries of physiology; it will be followed by a discussion. This section will hold a joint meeting with the section of Chemistry for a discussion on biochemistry. The section of Psychology, over which Professor C. Lloyd Morgan will preside, is to have a discussion, introduced by him, on consciousness and the unconscious, and will hold a joint discussion on vocational training and tests with the sections of Economics and Education. The discussion in the section of Botany, introduced by the president, Dr. D. H. Scott, F.R.S., will be on the present position of the theory of descent in relation to the early history of plants, and the section will join with those of Agriculture and Zoology in a discussion of the relation of genetics to agriculture. In the section of Zoology, Professor Goodrich, the President, will discuss some problems in evolution, and there will be a full-dress discussion on the age of the earth, in which this section and those of Physics, Geology, and Botany will combine. A series of citizens' lectures will be given: the first, by Sir Oliver Lodge, on wireless telephony; the second, by Dr. E. J. Russell, arranged by the section of Agriculture, on science and crop production; the third, by Professor A. Dendy, F.R.S., on the stream of life; and the fourth, by Professor H. J. Fleure, of University College, Aberystwith, on "Countries as personalities." Two evening discourses will be given: the first, on the evening of Friday, September 9th, by Professor C. E. Inglis, on cantilever bridge construction; the second, on the evening of Tuesday, September 13th, by Professor W. A. Herdman, F.R.S., on "Edinburgh and oceanography." A conference of delegates of corresponding societies will be held, under the presidency of Sir Richard A. Gregory, who will give an address, on Thursday, September 8th, on "The message of science"; this will be followed by a discussion on science and citizenship. There will be another discussion, on regional surveys, at a meeting of the conference to be held on Tuesday, September 13th. As has been said, there will be this year thirteen sections, but this is felt to be too large a number, leading to a diffusion of interest and energy and involving unnecessary expense. The subject has been under the consideration of the council and organizing committees during the past year, and will be discussed at a special session of the general committee on Thursday, September 8th, when proposals for reducing the number of sections in future will be brought forward.

THE LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY.

As happened in the case of most other societies, the activities of the Leeds and West Riding Medico-Chirurgical Society were lessened during the years of the war. Dr. T. Wardrop Griffith, who was the president during the year 1913–14, was followed in that position by Dr. Bates of Ilkley, who, at the request of the society, retained the position throughout the war. Some business meetings were held and one or two for scientific purposes. The sessions for 1919–20 and 1920–21 have been conducted in the same manner as before the war; in the former year Mr. Priestley Leech of Halifax was president, and in the latter Mr. Frank Mayo of Leeds. It has been the unwritten rule of the society to select its president from the city and from the district around in alternate years. In the first of these two sessions the opening address was delivered by Sir Clifford Allbutt, whose visits to Leeds are always so welcome and whose presence always ensures a full attendance of members; he gave interesting details of a scheme which he had seen in operation in America under which those in general practice in a given neighbourhood combined to form a sort of working team in relation to their private work; it appeared to have been

attended with a large measure of success. During the session ten meetings were held. The session 1920–21 was characterized by an almost complete return to the old activities of the society, though the numbers attending the meetings were not so great as for a few years before the war, the average attendance being fifty-seven as compared with seventy or eighty during these fat years. Eleven meetings were held—eight ordinary, two clinical, and one pathological. A great feature of the session was the paper read by the veteran, Mr. T. Pridgin Teale, on that subject which in past years interested him so greatly—namely, the removal of stone from the bladder by crushing. He described his instant conversion to the methods of Bigelow, and showed to the society a series of notes of his cases which left many of his hearers in chastened mood and led to the formation of many good resolutions. It is interesting to note that the Leeds and West Riding Medico-Chirurgical Society was founded on the old Leeds Medical Club, a small group of men, intimately known to one another, who were in the habit of meeting at each other's houses for the discussion of medical and surgical topics. The new society was launched in the year 1872 under the presidency of the late Dr. Chadwick, and with the late Dr. West Symes and the late Mr. A. F. McGill as joint secretaries. There are now 296 ordinary members. During the presidency of Mr. William Hall (1892–3), who was one of the original members, it was decided that a limited number of honorary life members should be elected from among the number of those who had retired from practice and who had done the society good service. There are many who will remember the occasion when the society welcomed the first three of these members in the persons of Dr. Allbutt (as he then was), Sir James Crichton-Browne, and Mr. C. G. Wheelhouse. Since then others have been added to this list of honour—namely, Dr. Churton, Dr. Eddison, who for so many years was treasurer of the society; Dr. Joseph Dobson, Mr. Charles Richardson, Mr. Pridgin Teale, Colonel Littlewood, who, it will be remembered, retired from practice, but returned to Leeds to do such valuable war service, and whose second departure followed soon after the signing of peace; Mr. Edward Ward, whose death during the past session has left a blank in the profession; Mr. R. Lawford Knaggs, whose work as secretary will long be remembered, and whose departure from Leeds deprived the society of the prospect of being able to ask him to accept the presidency; and, finally, Mr. William Hall himself, who was the originator of this method of honouring those who had brought renown on the society.

PREMONITORY SMALL-POX.

In the course of the present year there have been reported about one hundred cases of small-pox scattered over a wide area throughout England. Bristol, Birkenhead, Southampton and Middlesbrough among the ports, Nottingham, Long Eaton, Huddersfield, and a number of inland towns and villages, chiefly in Derbyshire and Yorkshire, have been the centres of greatest incidence. There has been no sustained outbreak—a case here, half a dozen there, and then, so far as these centres are concerned, cessation, but never a long interval before others are reported in quite a different locality; this is the record, and it is disquieting. In Derbyshire the disease smoulders, and in Nottingham and surrounding districts cases continue to occur; four were notified on August 16th. From January up to the end of May only one case of the disease was notified in Nottingham, and that was in the last week in February. In the first week of June one case occurred in Nottingham, and seven in the borough of Long Eaton, a town with a population of 20,000 persons seven or eight miles from Nottingham. A fortnight later another case was reported from Long Eaton, and during the first ten days of July two more cases occurred in Nottingham. In the five subsequent weeks fifty-three cases were notified in Nottingham; there have been no cases in Long Eaton since the middle of July. During July isolated cases occurred in Matlock, in New Mills, Codnor Park rural district, and Bakewell rural district. On August 16th a case was reported from Stapleford rural district. Of the fifty-six Nottingham cases six were men over 20 years of age, three of them were unvaccinated, and three were vaccinated in infancy. There were three cases under 1 year of age, eighteen between 1 and 10 years, fourteen between 10 and 20 years, and twenty-one were over 20 years of age. In Huddersfield there have been two cases, the first contracted in the town and not accounted for by previous known cases, the second a visitor from Wakefield, where small-pox has not been reported since last January. It is easy to control small-pox when all the cases and all the sources of infection are known, but it looks as though the cases were not all known and that there were sources of infection not yet detected. Persons who have been in contact with unrecognized cases cannot be kept under observation and cannot be offered vaccination. Diffusion by contacts is not the only means of spread. The suggestion that the Nottingham outbreak has its origin in a parcel of lace from the Continent which came to the town of Long Eaton cannot be negatived on general principles. Nottingham and Huddersfield are centres of the textile industries, and the first known case at Huddersfield was that of a woman woollen mender. Whatever may be the case with other infectious diseases, there is much support for the view that small-pox is spread by means of fomites. To a greater and greater degree this country is relying on sanitary measures other than vaccination for its protection. How little to be trusted some of these measures are is to be seen in the course of the present outbreaks. They rely for their effectiveness upon early and complete knowledge of the cases occurring; and in the nature of things this is not possible. When danger of small-pox threatens there is only one reliable protection, and that is an immunized population. During the past twenty years primary vaccination of infants has been increasingly neglected in this country, and in that time there has accumulated a large proportion of the population, especially the younger portion of it, wholly unprotected against small-pox. Under such conditions every outbreak of small-pox necessarily creates anxiety, or rather accentuates an anxiety always felt in the knowledge of the continued growth of a danger which the medical profession, despite its warnings, has been powerless to avert.

THE VOLUNTARY HOSPITALS COMMISSION.

The Voluntary Hospitals Commission appointed in accordance with the recommendations of Lord Cave's Committee has held several meetings and has appointed committees to deal with some of the matters referred to it. Its first duty is to distribute the Government grant of £500,000 so as to enable those voluntary hospitals which are financially embarrassed to carry on. One of the most important functions of the Commission, however, will be to help the hospitals to evolve a system which will enable them, with the resources at their disposal, to maintain a sound financial position. The Commission has taken steps to appoint voluntary committees throughout the country. In London, as the Cave Committee recommended, King Edward's Fund has been asked to undertake the duty; in the provinces the county basis has been in the main followed. The larger borough counties, such as Liverpool, Manchester, Sheffield, Birmingham, and Bristol, have been asked to form separate voluntary hospital committees, but the small county boroughs will, as a rule, be expected to join forces with the county. The method suggested for the formation of the county committees is that two representatives should be chosen by the county council and one by the town council of each county borough; two representatives would be drawn from the hospitals throughout the county, including those in the county borough, one of the repre-

sentatives being a member of the board of a large hospital, and the other of that of a smaller or cottage hospital; and two medical representatives would be chosen from the whole county, one a hospital consultant and the other a general practitioner. This will give six members for the county and one each for each county borough. In addition the Commission will be represented by not more than five members appointed directly by it. The Commission, we gather, did not intend that the medical members should be chosen in the manner indicated in a communiqué recently issued by the Ministry of Health—namely, by the local medical committees appointed under the Insurance Act. In a Current Note published in the SUPPLEMENT some of the objections which will be felt to this course are briefly indicated. The first duty of the local committees will be to collect for the Commission information as to the financial position of the hospitals; and the second, to inquire into the adequacy of the hospital accommodation provided. In this connexion the assistance which may be obtained from Poor Law infirmaries will be taken into consideration, and the local committees will be expected to report fully on this aspect of the matter. The local committees will also, it is hoped, help to co-ordinate appeals and to organize contributions by approved societies and by workmen, either directly or through local societies Another way in which it is thought that the committees may be useful is in arranging systems of transfer from one hospital to another. At many voluntary hospitals there are long waiting lists, but the beds are blocked by chronic cases which could be equally well treated, if not better, in a convalescent institution or in one specially adapted for after-care. It is not intended that the local committees shall attempt to control the hospitals in any way; it is hoped that they will act as assistants and advisers, not as masters.

THE NATIONAL PROVIDENT HOSPITAL SCHEME.

IT was announced early last month that the London Hospital, St. Thomas's Hospital, and the Royal Free Hospital, had resolved to make a trial of the voluntary insurance or provident scheme for hospital benefits and additional medical services known as the Sussex scheme, which was commended by Lord Cave's Committee. An organizing committee has been provided with a sum sufficient to cover initial expenses, and has established an office, with a secretary, at 3, Fenchurch Avenue. The members of the committee are Sir Arthur Stanley, Sir Alan G. Anderson, Sir Napier Burnett, Lord Dawson, Mr. McAdam Eccles, and Dr. Gordon Dill, who is acting as honorary secretary. The scheme is founded upon the Sussex scheme designed by Dr. Gordon Dill and described by him in our columns on January 22nd, p. 129. The committee has made arrangements with certain other hospitals and with the Queen's Nursing Association for carrying out the scheme, and has also entered into arrangements for an ambulance service. It is proposed that the enrolment of members shall begin on September 1st, and the benefits will, it is hoped, become available on October 1st. A conference was held at St. Thomas's Hospital on August 11th between the organizing committee and representatives of some of the approved friendly societies. The scheme was generally commended to the meeting by Sir Arthur Stanley, Sir Alfred Warren, M.P., Dr. Gordon Dill, and Mr. Lesser, and its working in Sussex was explained by Mr. A. L. Wright. At the conclusion of the discussion the following resolution, proposed by Mr. Henry Lesser, President of the National Federation of Employees' Approved Societies, and seconded by Mr. Dickinson, of the Port of London Authority, was carried unanimously: "That this conference is of opinion that the services made available by the national provident scheme are likely to prove of great value to members of friendly and approved societies, and recommend the several committees of management and their officers to bring to the notice of their members the opportunity which is given them by the organizing committee of joining the scheme."

POOR LAW MEDICAL INSTITUTIONS.

THE second annual report of the Ministry of Health, which relates to the year ended March 31st, 1921, is considerably shorter than the first. The Minister states that the change has been made for the double purpose of reducing the cost of production and of enlarging the circle of those who may be prepared to buy and read a yearly account "of some of the operations of government which affect most closely their daily lives." The price of this report (Cmd. 1446) is 2s. net; it is published by the Stationery Office, and can be obtained through any bookseller. The subjects dealt with include housing and town planning, local finance, the administration of the Poor Law, and the administration of national health insurance. The work of the Welsh Board of Health is dealt with in a separate section. The annual report of the chief medical officer, dealing with the year 1920, was issued a few weeks ago, and to it we propose to recur in an early issue. The part of the Minister's report dealing with Poor Law administration contains sections on medical institutions. Practically all the Poor Law infirmaries lent to the Army Council and the Ministry of Pensions have been restored and most of them reopened; in many instances additions made during military occupation providing better accommodation and equipment have been taken over. For instance, the Alder Hey Infirmary of the West Derby board of guardians now includes a special department for orthopaedic work. A survey made during the year of the fifty-four separately administered infirmaries made it clear that the majority would be capable of development on the lines of general hospitals. Many of the larger establishments in urban areas when restored by the military authorities were found to provide accommodation in excess of Poor Law requirements, and many boards turned their attention to the problem of making fuller use of this surplus accommodation for the relief of the voluntary hospitals. So far as this tendency has relieved the strain upon the general hospitals by diverting to Poor Law institutions cases which were, in fact, eligible for treatment under the laws for the relief of the poor, it has received the Ministry's entire approval, and as no sanction from the central authority was required for this development it has in many cases not been brought to official notice. The attention of the Ministry, however, has been drawn by protests received from medical organizations to the tendency shown by certain boards of guardians to cater for patients who are in a position to provide for themselves the treatment required. The Ministry in consequence has called the attention of such guardians to the limits of their statutory powers, and has pointed out that even if the Minister could, in justice to the medical and nursing professions, and without prejudice to the development of public health administration, acquiesce in the treatment of non-Poor Law patients, he could not, in the absence of statutory authority, legalize by sanction the action taken, or contemplated, by these guardians. Consultation between the guardians and representative bodies of the local medical profession and with the managers of voluntary hospitals was suggested, with a view to the division of functions between the local institutions and the provision of facilities for medical education in the Poor Law establishments by the association of infirmaries with neighbouring general hospitals. Reference is made to the arrangement under which the guardians of St. Marylebone were given authority to appoint a considerable number of consultants. As this experiment was considered to have been successful, the system has since been adopted in nine other metropolitan infirmaries and seven institutions under the control of the Metropolitan Asylums Board. The same system is being developed, it

is stated, by numerous infirmaries in the provinces, especially as regards the treatment of children. There is still a scarcity of applicants for the post of probationer nurse, in spite of the fact that the minimum age for admission was reduced during the war to 19 years, and that this plan is being continued. In spite of the shortage the proportion of nurses to the number of patients has increased in the larger institutions; in the twenty-three institutions and separate infirmaries in Lancashire the proportion is one nurse to every six patients.

THE IMPERIAL CANCER RESEARCH FUND.

THE nineteenth annual report of the Imperial Cancer Research Fund, approved by the General Committee last month, shows the present position of the finances and gives a summary of the investigations. The general scope of the work, as indicated in the report, embraces the culture of normal and cancerous tissues *in vitro*, the effects of deprivation of accessory food substances on tumour growth and studies in cell-respiration. In addition, brief reference is made to experiments on the production of tar cancer in mice, a line of work which the director, Dr. J. A. Murray, says is destined to play an important part in the elucidation of the processes which lead to the development of cancer. The report cannot fail to arouse interest in the forthcoming seventh scientific report, which will deal with this and other subjects in detail. We note that the general belief in the unlimited resources of the Fund is not borne out by the treasurer's report; the income for the past year was exceeded by the expenditure. This is emphatically a state of things which should be remedied as soon as possible, and we commend it to the notice of all who are able to help. In doing so they will be furthering, not only the work of this, our premier organization for the scientific study of cancer, but the cause of the investigation of the disease in other institutes of this country and throughout the world.

INTERNATIONAL CONGRESS OF MILITARY MEDICINE AND PHARMACY.

THE first International Congress of Military Medicine and Pharmacy took place at Brussels from July 15th to 20th, and was attended by delegates from the United Kingdom, France, United States, Italy, Japan, Spain, Sweden, Switzerland, Denmark, Holland, Norway, Brazil, China, Poland, Mexico, Argentina, Chile, and other countries, and by representatives of Red Cross Societies. The British representatives were Colonel E. M. Pilcher, Major A. D. Stirling, D.S.O., Surgeon Rear-Admiral J. Chambers, and Surgeon Commander E. T. Meagher. Dr. Wibin, Inspector-General of the Belgian Health Service, opened the Congress with an address, and a number of important discussions afterwards took place. In considering the general organization of the Army Medical Service and the relation of the military services to the Red Cross, the Congress approved the suggestion that the medical profession of a nation should prepare itself in times of peace for the part which it would have to play in war, and that in time of war it was necessary that medical advisers qualified by their scientific standing should be equally responsible to the high command with representatives of the medical service. The use of poison gas in war was discussed, and the Congress considered that there should be special mobile organizations in the army medical services for the treatment of such cases. It was agreed that pulmonary tuberculosis followed gas poisoning in exceptional cases only; the permanent disabilities which actually did follow included tachycardia, such chronic respiratory troubles as emphysema and asthma, neurasthenia and neuroses, and ophthalmic troubles. After a discussion of the lessons of the war as to the treatment of fractures of the limbs the Congress expressed the opinion that simple extension apparatus which had come into use during the war should be generally employed in future, and that it was necessary in peace to organize in the great industrial and urban centres special services analogous to those established in war for the treatment of fractures. The campaign against tuberculosis in the army was discussed, and it was agreed that, to be efficacious, it should be based primarily on a rigorous application of hygienic measures in regard to the housing, feeding, and physical education of the soldier, and that there should be a permanent liaison between the civil and the military administrations with regard to tuberculosis. With regard to the problem of venereal disease in the army, educative measures were advised as well as the promotion of various kinds of recreation and sport, in addition to prophylactic methods and the employment of the most modern methods of treatment for the affected soldier. The purification of water during a campaign was also discussed, and it was agreed that while the method of chlorination which had been employed in the war of 1914–18 had been thoroughly efficacious, it was desirable that further research should be made into the physical methods of sterilization, such as those based upon the employment of ultra-violet rays or of ozone. On the termination of the Congress it was resolved to appoint a permanent international committee, with Dr. Wibin as president and Dr. Voncken (Brussels) as secretary; Major A. D. Stirling was appointed the British representative on this Committee.

THE HALF-YEARLY INDEXES.

THE usual half-yearly indexes to the JOURNAL and to the SUPPLEMENT and EPITOME have been prepared and printed. They will, however, not be issued with all copies of the JOURNAL, but only to those readers who ask for them. Any member or subscriber who desires to have one or all of the indexes can obtain what he wants, post free, by sending a post-card notifying his desire to the Financial Secretary and Business Manager, British Medical Association, 429, Strand, W.C.2.

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

Medical Evidence in Courts of Justice.

LORD DAWSON'S notice of motion: "To call attention to recent rulings as to the privileges of medical men with regard to evidence in courts of justice, and to move that the matter be referred to a select committee of the two Houses of Parliament," stands on the Order paper of the House of Lords, without date fixed. It was postponed recently at the request of the Government.

War Pensions Bill.

Viscount Peel (Chancellor of the Duchy of Lancaster) moved the second reading of the War Pensions Bill in the House of Lords on August 9th. In summing up provisions which had already been explained in the House of Commons, he said that the general proposal of the bill, as regards local committees, was to make them advisory instead of executive. The Pensions Ministry would therefore have all the valuable assistance of local advice and knowledge, but would be able to control its own officials; and by the reduction in the number of the committees, from about 1,250 to about 450, some millions of money would be saved in the cost of administration. Touching the portion of the bill providing for final assessments of pensions, Lord Peel said he understood that at present 20,000 men were re-examined every week, thus a vast paraphernalia of doctors and others were involved, one doctor in every five in the country being engaged in the work. It would be possible to sweep away most of this imposing façade, the intention being that after a period of four years from the final discharge, or first examination, the pension would be made permanent. The Earl of Dartmouth recognized that the powers to be given to the Ministry over committees should be full, but he hoped that they would not be too full. He spoke with a considerable feeling as to the value of the local committees. Lord Harris raised some criticism as to the contemplated change in the personnel of the appeal tribunals, but Lord Peel explained, in his reply, that the reason why a second doctor was to be substituted for a lawyer was that while originally the questions dealt with were of a semi-medical and semi-legal nature, they had now become purely medical—the point being to settle the permanent disability of the men. The bill was read a second time.

The bill was taken in Committee in the House of Lords on August 11th. The Marquess of Salisbury, on behalf of Lord

Harris, moved an amendment to omit certain words in Subsection 3 of Clause 3, in order to retain the arrangement under which a lawyer, a doctor, and an ex-service man constitute an appeal tribunal. Under the bill the proposal is that there shall be two doctors and one ex-service man. Lord Salisbury urged that it was unwise to get rid of the lawyer, as questions of earning capacity and other considerations, besides those of the physical condition of a man, might arise, and they were not doctors' questions at all, but general. Viscount Peel, in reply, explained how the proposal arose to eliminate a lawyer and substitute a second doctor. The Select Committee of the House of Commons that sat during 1919-20, on the question of pensions awards, held that there should be a majority of medical men on the committee, as well as an ex-service representative. If the medical men were to have a majority in accordance with that recommendation, it would be necessary, in the event of a lawyer being retained on the committee, to increase the number of medical men to three. With the number of these appeal tribunals, that would seriously increase the cost of administration. The remark of the Marquess of Salisbury, that a lawyer was a better judge than a doctor of earning capacity, appeared to be based on observations of past practice and not on the system to be inaugurated under this bill. The old practice was not based on the principle that compensation for war disablement must be uniform for all disablements of the same kind and degree. The present principle was based on the degree of disablement, and was uniform for all disablements of the same kind and irrespective of earning capacity. The Minister held that they had reached purely medical questions on which only medical men could have a view. The Lords' amendments were accepted by the Commons on August 16th.

National Insurance Panels.—Mr. Alfred T. Davies asked, on August 10th, whether the attention of the Minister of Health had been called to the allegations of the high chief ranger of the Order of Druids regarding the workings of the National Insurance Act, to the effect that the Ministry doctors issued certificates habitually without seeing the insured persons; that there was a medical tendency to refer patients for hospital treatment as out-patients, as doctors then received the capitation fee, whether the patient was well or ill; that in some cases doctors showed reluctance to call on patients outside surgery hours; that the number of panel patients was in numerous cases beyond the physical capacity of doctors adequately to deal with; whether any inquiry would be made into these allegations; and whether, if they were found accurate, improvements in the services would be introduced without delay. Dr. McDonald asked also, whether the Minister's attention had been called to the fact that many panel medical men issued certificates of illness without even seeing the patient; that private patients very often received priority of attendance when medical practitioners had a combined practice; that many panel patients requesting attendance at home on account of serious illness, were asked to call at the surgery; and that many panels were too large to secure necessary and efficient service. Sir A. Mond said he had seen press reports of the allegations, and if specific cases in support were given to him he was quite prepared to go into them. A certain number of complaints must arise in working so large a scheme, and machinery was supplied under the regulations for investigating complaints and imposing penalties if necessary. He was considering whether the time had not come for a general inquiry into the working of the National Insurance Act. Mr. Purchase inquired the maximum of patients a doctor might have on his panel, and to what extent he might increase the number by having assistant doctors. Sir A. Mond replied that the limit of the number of insured persons whom an insurance practitioner might have on his list was determined by a scheme made for each area by the Insurance Committee and the Panel Committee, jointly, and the extent to which the limit might be increased, when the doctor engaged one or more permanent assistants, was determined by the Insurance Committee, who was required to have regard to the particular circumstances of the doctor's practice. No doctor working single-handed might have more than 3,000 persons on his list. The maximum had been fixed in a large number of areas at 2,000 to 2,500, and the average number per doctor was approximately 1,000. In reply to further questions, on August 15th, Sir Alfred Mond made similar replies. Sir B. Chadwick then asked the Minister whether he proposed to make representations to the British Medical Association. Sir Alfred Mond replied to the effect that he did not think anything could be gained by that. In cases where it was proved at an inquiry that the continuance of a practitioner on the medical list would be prejudicial to the medical service of the insured the practitioner was removed, and adequate machinery existed and was freely used for dealing with offences of a less serious character for which removal from the list would be too severe a penalty. Twenty-nine practitioners had been removed from the list since the Act came into operation.

Insurance Practitioners: Travelling Grants.—Mr. Lambert asked, on August 9th, the terms of the regulations by which grants are made for medical men under the Insurance Acts for mileage and travelling. Sir A. Mond replied that a Central Mileage Fund was constituted, into which the sums available for mileage were paid (Article 19); that a committee known as the Distribution Committee, consisting of insurance practitioners and other persons, reported to him as to the basis on which the sums in the Central Mileage Fund should be distributed amongst Insurance Committee areas (Article 20); and that the sums allocated to each area after consideration of that report were distributed amongst the practitioners in accordance with the scheme prepared jointly by the Local Panel Committee and the Insurance Committee, which was subject to his approval (Article 21).

Deposit Contributors for Health Insurance.—In reply to Sir M. Moore, who asked, on August 11th, the amount of the available surplus of deposit contributors for the five years ended December 31st, 1918, Sir A. Mond said the deposit contributors were entitled to the ordinary benefits under the National Insurance Acts only so far as the sum standing to their individual credit would admit, and no question of a valuation therefore arose. No medical funds in respect of deposit contributors remained unallocated; the total amount payable to medical benefits was distributed annually.

Safeguarding Industries Bill.—On report on this measure on August 10th, Captain W. Benn moved a new clause for exemption of goods used for educational or scientific purposes. He and Major Barnes (who seconded) recalled the expressions of opinion that had been given by a number of scientific workers, as to the seriousness of the extra charge to be put upon them in their operations in the event of the passage of this bill. Sir Philip Magnus, insisting that he remained a Free Trader, urged that it was essential to maintain the infant industries established during the war, otherwise the country would again be entirely at the mercy of the foreigner for necessary apparatus. He suggested that the cases of schools and laboratories might be met by the Government giving them the 33⅓ per cent. that might be paid for imported articles, on condition that they purchased them in this country. Captain Coote also favoured, as an alternative, the payment of a direct subsidy to scientific and educational institutions. Sir P. Lloyd Graeme, for the Government, reiterated their view that it was essential to maintain the struggling industries, and he pointed out that the provision was only for five years. Dr. Murray spoke cynically of the temporary character of the provision. On a division the new clause was rejected by 231 votes to 80. On report on the Schedule, on August 11th, Mr. A. Williams moved to leave out the words "optical glass and optical elements, whether finished or not, microscopes and opera glasses, theodolites, sextants, spectroscopes, and other optical instruments." Optical elements, he said, included such things as ordinary spectacle glasses. Sir Philip Magnus, without repeating his previous arguments in favour of the Government proposal, dealt with the suggestion that the manufacture of this glass in the country might be preserved by means of a subvention. He pointed out that a subvention would have to be paid by our Government, whereas, in the case of a tariff, the money was paid by the other Government. He insisted that, in Great Britain, optical glass and instruments could be produced in every respect as good as those manufactured in foreign countries, but not at anything like the same price. He did not attach any importance to the argument that the instruments could not be obtained by our universities; the additional cost to any research laboratory of paying a little more for the expensive instruments required was a fraction compared with the absolute necessity of being able to produce these instruments in Great Britain in the event of war. It was a tax that would be readily paid for the sake of security. It would not fall on the schools, or colleges, or research laboratories; it would be paid by the Treasury, who would give these institutions sufficient grants to enable them to make the purchase. Dr. Murray supported the amendment, and quoted from a statement issued by the British Optical Manufacturers Association to show that the circumstances of the war were promptly met. On a division the amendment was rejected by 170 votes to 61.

The Spread of Cholera from Russia.—Lord Askwith, in the House of Lords on August 11th, sought information as to famine conditions in Russia, and raised the question of the danger of the spread of cholera and typhus to other countries. The Earl of Crawford, in reply, said that reports of cholera outbreaks in certain parts of Russia were received as early as last year, and it was believed that a severe epidemic had broken out in the famine area. According to the figures quoted in the soviet press up to July, 27,000 cases had been reported. Any measures taken to assist the famine-stricken areas would have to include measures for the prevention of the spread of cholera and other infectious diseases, and the whole matter of relief was being considered by the Allied Supreme Council in Paris. Lord Onslow (the Under Secretary to the Ministry of Health) informed him that measures to deal with the possible importation of cholera were undertaken in this country in accordance with the International Sanitary Convention, 1912, under regulations of the Ministry of Health, and were administered by port sanitary authorities and medical officers. The Minister of Health had already called the attention of port medical officers of health to the possibility of the occurrence of ship-borne cholera at the present time. Information as to the prevalence and spread of cholera obtained by the Ministry was systematically communicated by cable through the Dominions, which all possessed well-organized port sanitary services.

Regional Medical Officers.—Sir J. D. Rees asked, on August 10th, whether the Minister of Health was aware that the opinion was held by county councils that the appointment of regional medical officers at £1,000 a year was waste of money, their duties being simply to receive reports of tuberculous cases to pass on to the council's officers; whether his attention had been called to this matter by the County Councils Association, and whether he would reconsider these appointments with a view to their early abolition. Sir A. Mond replied in the negative. He said

that only a very small part indeed of the time of a regional officer of the Ministry was required for the duty mentioned, of securing due preparation and transmission to tuberculosis officers of the reports which insurance practitioners were required to furnish. As to their main duties, Sir A. Mond referred the inquirer to previous answers. Sir J. D. Rees asked whether the Minister was aware that the chairman of the Nottinghamshire County Council declared the other day that these officers had no duties whatever to perform, and that their salaries were therefore wasted. Sir A. Mond rejoined that he did not think that the chairman of the Nottinghamshire County Council knew what the duties were.

Criminal Law Amendment Bill.—The Commons amendments to the Criminal Law Amendment Bill were considered in the House of Lords on August 15th, when the Bishop of Norwich was in charge of the measure on behalf of the promoters. The Earl of Malmesbury moved the rejection of the new clause (after Clause 3) to make acts of gross indecency by female persons a misdemeanour punishable under the Criminal Law Amendment Act, 1885. The Earl of Desart and the Lord Chancellor strongly urged the excision of the clause on the grounds that the subject had not been considered by the Joint Committee of the two Houses, upon whose findings the present bill was based; that the law and police authorities had not been consulted, and that the provision would give rise to blackmail. Lord Birkenhead said there was no evidence of any widespread practice of such vice. The Bishop of Norwich agreed with the conclusion reached, and the clause was rejected without a division. The Lords also disagreed with the Commons addition to Clause 5, which, in repealing the regulation that the trials of incest cases should be *in camera*, proposed to give any judge power to direct that any particular case should be heard *in camera*. The Lord Chancellor stated that the judges did not desire such discretion, and that it would be against practice.

Treasury Grants and University Colleges.—Mr. Gilbert asked, on August 11th, what amounts had been annually granted by the Treasury to universities and university colleges since the Advisory Committee was set up; whether such grants were for capital or maintenance, and particulars of the reference. Mr. Young replied that the amounts granted by the Treasury since the University Grants Committee was set up were as follows:

	£
1919–20:	
Recurrent grants	789,500
Non-recurrent grants	295,500
1920–21:	
Recurrent grants	976,127
Non-recurrent grants	277,000
1921–22 to July, 1921:	
Recurrent grants	489,063
Non-recurrent grants	242,000
	£3,069,190

The recurrent grants had been for maintenance only and not for capital; the non-recurrent had been principally for capital, but to some extent for maintenance. The reference to the Committee was as follows: "To inquire into the financial needs of university education in the United Kingdom, and to advise the Government as to the application of any grants that may be made by Parliament towards meeting them." The members of the Committee were as follows: Sir William McCormick, LL.D., Chairman; Mr. William Bateson, F.R.S., Sir Dugald Clerk, K.B.E., F.R.S., Sir James Johnston Dobbie, F.R.S., Miss S. M. Fry, Sir Frederick George Kenyon, K.C.B., Sir Wilmot Parker Herringham, K.C.M.G., C.B., M.D., Sir Stanley Mordaunt Leathes, K.C.B., Sir Joseph John Thomson, O.M., F.R.S. None of the members receive any remuneration except the chairman, who received in this capacity a salary of £1,300 per annum, with an allowance for expenses (including subsistence) of £500.

Voluntary Hospitals Grants.—Mr. Gilbert asked, on August 10th, what were the amounts paid in the years 1914 to 1919 respectively as grants in aid of the London voluntary hospitals in consideration of their treating sick and wounded soldiers and sailors. Lieut.-Colonel Stanley answered that the amount paid during the period mentioned was £880,000. He could not give the sum in respect of each year. Mr. Gilbert inquired whether it was proposed to publish the evidence given before Lord Cave's Committee on Hospitals. Sir A. Mond said that, in view of the cost of printing, this would not be done.

Pensions Committee Appointments.—Asked by Dr. McDonald, on August 11th, if the Ministry of Pensions would issue instructions that while Pensions Committees were being organized no conscientious objector should receive an appointment until the claims of ex-service men had been satisfied, Mr. Macpherson said that preference had always been given to ex-service men.

Pensions Appeal Tribunal.—In answer to Sir H. Brittain, Colonel Gibbs said, on August 11th, that the average period which elapsed between the date on which an appeal was received by the Pensions Appeal Tribunal and the date on which it was heard was eight weeks. Approximately 20 per cent. of the cases had to be adjourned owing to the non-attendance of the appellant or for other reasons.

Vaccine Treatment of Lunacy.—Mr. Gould asked, on August 11th, whether the attention of the Minister of Health had been drawn to the articles in the press in reference to the cure of lunacy by vaccine injections; whether he was aware of the allegations that many potentially healthy minded persons were needlessly confined in an asylum because of the lack of proper curative treatment; and whether he would initiate an investigation into the Lunacy Laws and asylum administration with the object of making such treatment available to the mentally afflicted confined in asylums. Sir A. Mond said he had seen the article. There was no obstacle to the use of vaccine in any case in which that form of treatment was considered suitable by the medical authorities of an asylum. He had under consideration the question of possible reforms in lunacy adminstration and treatment.

Dangerous Drugs Act Regulations.—Mr. Shortt stated, on inquiry by Mr. Gilbert on August 11th, that the Regulations under the Dangerous Drugs Act would come into force on September 1st. He could not say definitely what other Powers had passed legislation to carry out the Convention of 1912, but the Powers which were signatory to the treaties of peace undertook to enact the necessary legislation without delay and at latest within twelve months from the treaties coming into force. Full information as to the position in each country was being collected by the League of Nations, which was entrusted with the general supervision over the execution of the Opium Convention.

Poison Antidotes.—Brigadier-General Surtees introduced, on August 9th, a bill to provide that the receptacle of each poison sold by retail shall bear a printed description of an antidote for that poison. It is a measure of three clauses of twenty lines; the first lays down the provision, and the second the penalty, on failure of compliance—namely, a fine not exceeding £5 for each offence. The third states that the bill shall not apply to Ireland. Dr. Nathan Raw and Mr. Percy back the measure.

Deaths of Animals from Unknown Causes.—Captain Coote asked, on August 9th, whether the Minister of Agriculture was aware of the nuisance occasioned by the clumsy procedure necessary in the notification of the death of animals from unknown causes; and whether he could see that in future the police would transmit these notifications direct to the local veterinary officer instead of indirectly through the Ministry. Major Barnston replied that the Minister was unaware that the procedure was clumsy or inconvenient. In dealing with suspected outbreaks of diseases scheduled under the Diseases of Animals Act it was necessary to take every precaution to prevent them from becoming epidemic. This end could only be successfully obtained by a central authority, which was in a position to co-ordinate any necessary control measures; and the Minister was therefore not prepared to modify the order by which the Ministry required to be notified immediately of all suspected outbreaks of diseases.

Committee of Inquiry on Artificial Limbs.—Mr. Macpherson informed Major Cohen and Captain Elliot, on August 11th, that he understood that the report of the Committee on Artificial Limbs would shortly be submitted; it would be published as soon afterwards as possible.

Holloway Prison: Lady Superintendent.—Viscountess Astor asked, on August 11th, whether the lady superintendents recently appointed in Holloway Prison possessed medical or nursing qualifications. Mr. Shortt replied that one of these ladies was a nurse who had had much experience in charge of outside hospitals. She had the supervision of all the hospital work of the prison and of the hospital staff, subject to the control of the medical officers and the governor, who was a medical man. The other had had great experience as a prison officer and had the supervision of the disciplinary side of the prison with its staff, subject to the control of the governor.

Registration of Nurses.—Lieut.-Colonel Sir J. Hope, on August 10th, asked whether a nurse who had been trained in Scotland, and was practising in Scotland, could be admitted to the English register and thereby remove herself entirely from the jurisdiction of the Council of the country in which she was practising; and whether he would consider amendment of both the English and Scottish rules, so that all nurses should originally register in the country in which they were practising, but should be able to be placed on the register of the other country without difficulty or payment, if they afterwards desire to practise in it. Sir A. Mond said he was advised it was not competent to the General Nursing Council to refuse to admit to the register a nurse who was otherwise qualified on the ground that she was not practising in the country. Registration was purely voluntary, and no nurse could be brought within the jurisdiction of any of the three Nursing Councils, except by her own choice. A nurse practising in Scotland would derive no advantage from admission to the English register, since she would not thereby be entitled to describe herself in Scotland as a registered nurse. Sir J. Hope inquired whether the Minister realized that the whole object of the Act would be defeated if these Councils had no jurisdiction over the nurses in their own country. Sir A. Mond rejoined that they had, but Sir J. Hope remained unsatisfied on the point.

The Licensing Bill.—The Lords' amendments to the Licensing Bill were accepted by the Commons on August 16th.

Training in Sanatoriums.—Sir Henry Harris asked, on August 9th, whether the Minister of Pensions would state the conditions on which payment of bonus was made to men undergoing treatment in sanatoriums, and the amount paid to such men by way of bonus. Major Tryon replied that the payment of training bonuses to the class referred to was subject to the same conditions as obtained in regard to training given at a Ministry convalescent centre. The information sought in the second part of the question was not available.

England and Wales.

THE WELSH CONSULTATIVE COUNCIL'S REPORT.

WE announced in this column last week (p. 255) that the second report of the Welsh Consultative Council of the Ministry of Health had been presented to Parliament, and gave a summary of the scheme drawn up by the Council for providing a network of institutions for the Principality. The following is a summary of the remaining sections of the report.*

Infectious Diseases Hospitals.

The number of small-pox hospitals in Wales is 21; many have never been used and the remainder very seldom. The Council recommend that the present system, which is neither economical nor desirable, should be reviewed from a broad national standpoint. There are 55 hospitals for fever cases (scarlet fever, diphtheria, and enteric fever), containing 1,292 beds, but several of the hospitals are unsatisfactory and inconveniently situated; large parts of several counties have no satisfactory means of isolating the infectious sick. It is recommended that fever hospital accommodation, conveniently situated, should be provided, giving at least one bed for every 1,000 of the population in the thickly populated areas and at least one bed for every 4,000 in sparsely populated areas. Provision should be made for emergency expansion to meet sudden outbreaks on a large scale. Special institutional provision is not recommended for measles and influenza, but the Council is of opinion that accommodation should be available at every fever hospital for complicated or exceptional cases.

It is advised that a complete survey should be made of the needs of the whole coast line of Wales from the point of view of port sanitation, and that the administration should be charged to one national authority.

Tuberculosis Hospitals and other Institutions.

The Council refers to the work of the Welsh National Memorial Association for the Prevention, Treatment, and Abolition of Tuberculosis, and appends to the report a statement as to the organization and administration of the Association which works a comprehensive national scheme. In addition to convalescent homes, of which there are eleven in Wales, the Council advocates the provision of rest (or holiday) homes for the benefit of workers who, though not actually suffering or recovering from definite illness, may be run down in health and need a period of rest and refreshment. Open-air schools, health centres, and colonies for children should also be provided. At present such provision is limited to one open-air school, at Aberdare, for mental and physical defectives. Mental deficiency institutions are needed and should be organized as colonies.

The Council contemplates that there should be an adequate supply of two types of specialists and consultants—namely, full-time specialists in certain diseases (such as tuberculosis physicians) and part-time specialists whose services would be available in the various institutions.

Local Health Administration.

In Part II of the report comments are made on the complexity, the ineffectiveness, and in many cases the unsuitability of the present system of local government in matters pertaining to the health of the community. There are in Wales nearly 1,000 separate public authorities concerned with some branch or other of health work. Except for Glamorgan and Monmouth the county units are, in respect of population and assessable value, exceedingly small as compared with the county units in England. The Council considers it essential (1) to introduce the principle of one national supervising local authority in Wales endowed with adequate statutory powers; (2) to reduce the number of separate health authorities and to map out a co-ordinated network of Statutory Health Committees, responsible to the national authority; and (3) to ensure that the national authority and the local committees, acting in co-operation and in their respective spheres, shall have power to correlate between the preventive and curative aspects of a public health service.

The Council, after setting out each of six alternative schemes considered, recommends the scheme described below as the only one which could be put into practical operation pending the devolution of parliamentary responsibility. As the scheme involves the imposition of financial obligations upon existing local authorities, the constitution of the national body has been fixed so as to place representatives appointed by local authorities in a substantial majority.

Scheme for a National Council of Health.

1. *National Council.*—A Council, to be called "The Welsh National Council of Health," to be established by statute as the sole Local Health Authority for Wales and Monmouthshire, and to be subject to the control and supervision of the Minister of Health. The duties of the Council to include the following:

(i) To provide for the progressive development and comprehensive organization of health services and institutions in Wales and Monmouthshire;

(ii) To control and be responsible for the efficient administration—

(*a*) of health services and institutions transferred to it; and

(*b*) of health services and institutions supplied or provided by the Council;

(iii) To inspect and, subject to conditions, to approve and make grants in aid of health services and institutions in Wales and Monmouthshire supplied or provided by voluntary organizations;

(iv) To co-ordinate health services and institutions in Wales and Monmouthshire, whether transferred to, or supplied or provided by, voluntary organizations.

The powers and duties relating to health of existing Local Authorities and Boards of Guardians in Wales and Monmouthshire, and the powers and duties of Insurance Committees (except those relating to the cash benefits of deposit contributors, which should be transferred to the Minister of Health), to be transferred to the Council. The Council to receive and, subject to the approval of the Minister, to apply moneys provided by Parliament or raised by County and County Borough Councils or received from any other source, in respect of the health services and institutions of Wales.

2. *Local Health Committees.*—The Council to be required, in the discharge of certain of its duties, to establish and constitute Local Health Committees, and, subject to certain conditions, to utilize for this purpose existing Local Public Health Authorities.

3. *Regional Health Committees.*—The Council to be empowered to appoint Regional Health Committees, to which it may delegate certain of its duties.

4. *Constitution of National Council.*—The Council to be appointed as follows:

(*a*) Members appointed by the *elected* members of County and County Borough Councils, and of Urban and Rural District Councils with populations exceeding 40,000	41
(*b*) Members, including women, appointed by the Minister	24
	65

The number of members appointed under (*a*) to be made up as follows:

1 member to be appointed by each of the Councils named.
1 *additional* member if the population of the Council's area is between 75,000 and 150,000.
2 *additional* members if the population of the Council's area is between 150,000 and 300,000.
3 *additional* members if the population of the Council's area is between 300,000 and 450,000.
4 *additional* members if the population of the Council's area exceeds 450,000.

5. *Central Committees.*—The Council to be empowered to appoint such Central Committees from among their own members as they think fit, and to delegate to such Committees any of their powers except the raising or borrowing of money. The Council to be required to appoint (*a*) a Finance Committee, and (*b*) an Executive Committee.

6. *Advisory Committees.*—The Council to appoint such Health Advisory Committees as it thinks fit, every Advisory Committee to include women as well as men, and to consist of persons having special knowledge or experience.

The report is signed by 28 out of the 30 members of the Council. Certain members have, however, made a reservation to the report to the effect that the proposed National Council should be mainly directly elected by the people instead of by the Councils, and one member (Mr. D. Lleufer Thomas) suggests a method of arranging the voting at the elections.

* Cd. 1448. To be obtained from H.M. Stationery Office, 1, St. Andrew's Crescent, Cardiff, or from the Imperial House, Kingsway, London, W.C.2. Price 9d. net.

THE FINANCE OF LONDON HOSPITALS.

King Edward's Hospital Fund for London has issued a circular to London hospitals making suggestions with regard to collections from employees. The Fund has held a series of conferences with representatives of the various central agencies. The discussions have had as a starting point the opinion expressed by Lord Cave's Committee, that a larger development of collections from wage-earners is possible in the London area. A conference of hospital representatives, held at the Mansion House on July 6th, recommended that an attempt should be made to ensure co-operation between the hospitals and the central agencies in making local collections from employees. The outcome of the conferences so far may be summarized as follows: It is suggested that the metropolis (within nine miles of Charing Cross) should be divided into hospital areas arranged round key hospitals for the purpose of collections from employees, and that in each area committees should be formed in connexion with the key hospital or hospitals consisting of the local representatives of the Hospital Saturday Fund, the League of Mercy, and other organizations, to co-operate in securing the maximum collections from the employees in the area. It is proposed that there should be a general arrangement under which hospitals actively co-operating with the Hospital Saturday Fund and the League of Mercy should be assured of a due proportion of the proceeds of the local collections from employees. It is stated that the question whether changes in the existing practice as regards weekly contributions should be made, and if so the nature of the changes which are desirable, is still under consideration, and it is pointed out that if a given weekly sum was in 1914 an adequate contribution on the part of an employee towards the provision of free treatment when needed, the same weekly sum cannot now be adequate when the cost of hospital treatment is so much greater and patients generally are expected to contribute. The questions under discussion are whether the remedies should be sought in increased weekly contributions or in weekly contributions combined with patients' payments. Further, local conferences are considered desirable, and the King's Fund Policy Committee offers to help in arranging them. A separate part of the circular deals with the co-ordination of appeals to the public; no plan is put forward, but any hospital which may be contemplating a special appeal is asked to communicate with the King's Fund before launching it.

Ireland.

IRISH POOR LAW REFORM.

SEVERAL counties in Ireland have adopted far-reaching reforms of the Poor Law system. In all cases the county is adopted as the unit of administration, and boards of guardians are without exception abolished. So far the scheme for the county Clare seems to be the most practicable and workable of those put forward. In many respects it follows closely on the lines of the report of the Irish Public Health Council, as will be seen from the following summary of the scheme:

For public health administration it is recommended that the county be a unit, and that all public health services be co-ordinated and administered by a single body, to be known as the County Board of Health, with authority over the medical staff, nursing staff, health inspectors, and have control of home assistance.

The Board of Health would consist of thirty members—county councillors, chairmen of rural and urban councils, members nominated by the county council, representatives of the county insurance committee and of the county medical association.

All the public health powers vested in the guardians would be transferred to this Board, which would have power to delegate its functions to subcommittees, to which non-members might be appointed—representatives of the local rural and urban bodies and locally elected bodies.

It is recommended that there be a fixed maximum county-at-large public health rate of 4s. in the £, and a supplemental rate in the more highly rated districts in proportion to their relative rates and the amounts by which their demands exceed their quota on the flat rate.

The report recommends that there should be five public health institutions—namely, a mental hospital; a county central home (Ennis Workhouse) for aged and chronic hospital cases, the harmless insane, and a detached portion for tuberculous cases; a county nursery (portion of Kilrush Workhouse); district hospitals (four); and an inter-county sanatorium. The committees of management of these institutions would include persons, including ladies, who are not members of the Board of Health. Stringent regulations are proposed regarding admission to the various institutions.

The Board of Health would have full power over the medical staff, its appointment, and the areas of operation, and provision is made, "if possible," for automatic promotion. Similar provisions are made for the nursing staff. Only nurses with medical and surgical training would be admitted to the county nursing staff.

Home assistance would include old age pensions, pensions for the partly blind, out-of-work donations, insurance benefit, maternity benefit, war pensions, outdoor relief, and boarding-out allowance.

Officers who lost their positions under the scheme would get the superannuation to which they were legally entitled under the ordinary civil law, excluding recent enactments; existing officers to get the option of taking any available positions.

"By ruthless economy," says the report, "by annexing old age pensions, by enforcing payment in the mental hospital and in the district hospitals, by keeping track of all pensions, Government donations, and insurance grants, it is possible to reduce the cost of Public Health Service by 1922 to £90,000 per annum—that is, to bring it within the county at large *plus* the grants.

The scheme involves the abolition of the present Poor Law system, and the workhouse and boards of guardians would cease.

IRISH TRADES CONGRESS AND A MEDICAL SERVICE.

The following resolution was unanimously passed at the recent meeting of the Trades Congress:

> That the National Executive be instructed to draw up for the benefit of Labour members of local authorities a comprehensive scheme of Public Health Service reforms towards the attainment of which all Labour members of local authorities could use their influence.

Correspondence.

THE POST-GRADUATE COMMITTEE'S RECOMMENDATIONS.

SIR,—So many people seem to be interested in the subject of post-graduate study that it is curious that the publication of the recommendations of the Athlone Committee in your issue of June 25th has produced so little comment. Many post-graduate courses already exist, some appear to flourish; the publication of the Athlone Report, with its proposals for an extensive, complete, and comparatively costly system of post-graduate teaching, raises the question, wherein have existing courses failed, and why? As I deplore the possibility of State intervention in a matter with which the medical profession ought, in my opinion, to be able to deal, I venture to submit my views under the headings (*a*) the student; (*b*) the teaching centres; (*c*) the central office; (*d*) finance.

The Athlone Committee has classified seven different kinds of possible student. This seems to me to complicate matters unnecessarily, although it is quite wise at the outset to clear one's mind with regard to different types. For example, in studying the possible sources of supply of students from amongst general practitioners, some such division as the following might be useful: (1) General practitioners of capacity who keep themselves abreast of the times by reading, observation, clinical assistancies at hospitals, and visits to their own hospitals gratuitously when they so desire; (2) general practitioners, overworked, but of sufficient capacity for the purposes for which they are required, who are not going to "waste" their holidays on post-graduate study; (3) general practitioners of no capacity and not overworked, but with no desire to spend money on mental improvement, even when mental improvement is possible; nothing will stir this class out of its "pathetic contentment"; (4) general practitioners with some brains, a little money, and no work. This is perhaps the class from which many post-graduate students are drawn. No doubt there are other classes of practitioners; for the moment these may give sufficient food for thought. However many classes we may divide our material into, I venture to suggest that for practical purposes there are only two that count: First, those who want a special course, either of an advanced nature or in a special subject; secondly, those who want to polish

up minds which have become rusty, or else have been narrowed by routine. The first class may be illustrated by the men who used to go to Vienna from many parts of the world for special courses; the second, by the naval or military medical officers before Millbank and the West London Hospital offered them post-graduate facilities.

It seems to me that it is an exaggerated estimate of the men available for post-graduate study which has induced the Athlone Committee to lay so much stress on the immediate need for a post-graduate hospital. No doubt such an institution is the ideal to aim at; but until further information is available as to the number of students who will present themselves for courses of study, the length of course they are willing to take, and the seasonal variations in the demand, it might be well to see what can be done with existing facilities. Moreover, it will not be easy to fit in satisfactorily the work that should be undertaken by the two main types of student, for one of which the leading experts of world-wide reputation are required as teachers, while the other is probably better dealt with by younger men of good teaching capacity but perhaps unknown to fame. The Fellowship of Medicine has tried to supply the want in certain directions in which it has not been met by existing post-graduate schools or courses. It has accomplished most valuable work by establishing a central office, comparable on a small scale to the central office suggested by the Athlone Committee. Such an office should be able to distribute would-be post-graduate students of either type in appropriate directions. Unfortunately the Fellowship of Medicine has not yet succeeded in making its scheme all-embracing; it appears to have asked too much of some of the undergraduate schools, whose teachers found too great the strain of teaching post-graduates as well as undergraduates; and the expenditure on the office has eaten up too large a proportion of the students' fees, with the result that in many cases a totally inadequate portion has been left for division amongst the teachers. Therefore we are faced with the great difficulty in establishing a post-graduate system—the lack of funds. To assist in arriving at an estimate of immediate requirements I suggest that it should be a settled policy that the whole of the fees paid by the students should go to the teachers, until such time (if ever) as the number of students presenting themselves enables the cost of administration, as well as of instruction, to be covered by their fees. If it is wiser at the present time to postpone the establishment of a post-graduate hospital, then the immediate financial requirements are those for the maintenance of an efficient central office. For this purpose I am of opinion that in the initial stage £1,000 a year should suffice, and would finance the establishment of a thoroughly sound post-graduate scheme. If the fees of students are ruled out for administrative purposes, whence can this £1,000 a year be obtained? (1) Directly through some State department, such as the Ministry of Health. (2) From the Treasury through the University Grants Committee. (3) From a generous donor or donors. (4) From contributions by various bodies concerned in the honour and interests of the medical profession—for example, the Royal Colleges, the British Medical Association, and other bodies. It will be a pity if (1) should be the source; (2) is also a State source, though perhaps less objectionable. At present the University Grants Committee refuses to recognize anything which is not a definite school of a university. But if that Committee regards post-graduate study as really desirable, might it not consider the possibility of backing its opinion by affording some support to a really satisfactory scheme for a central office? (3) would be an ideal method, but the generous donor is almost extinct; (4) should be a far more likely source of funds considering that all such bodies seem agreed as to the value of, and need for, post-graduate instruction. Is it impossible for these bodies to make an attempt to keep out State interference until it has been proved to be necessary? And if they find it impossible to shoulder the whole cost of administration, might not the University Grants Committee feel inclined to relax its strict interpretation of its functions by contributing some portion of the expenses of an office for a year or two? In any case, ought not such a proposition to appeal to existing post-graduate establishments, whose existence is likely to be jeopardized if ever the proposals of the Athlone Committee materialize?—I am, etc.,

London, W., Aug. 13th. C. BUTTAR.

CLINICAL AND LABORATORY METHODS.

SIR,—"M.B.Lond." (p. 262) misapprehends the purpose of the St. Andrews Clinical Institute. We employ every available means in the examination of patients, including *x* rays. We have on our staff an expert chemist and an expert bacteriologist. In advanced diseases we sometimes get valuable assistance from these sources, but in the early stages of disease we rarely find them of help. The early signs of disease are in the main subjective, due, as a rule, to functional disturbances of the organs. These functional disturbances are too subtle for laboratory methods to detect, but the sensitive structures of the body react to them, and produce sensations which the individual recognizes as signs of ill health. These sensations are as distinct and as instructive as any of the phenomena revealed by laboratory methods, but medicine has not advanced far enough to recognize this, and consequently the mechanism and the significance of these sensations and the methods required to discover them are not understood.

When we examine a patient and fail to discover the nature of his complaint we do not say the disease is undiagnosable; we say the symptoms are plain and distinct, but we are, as yet, too ignorant to understand them.—I am, etc.,

J. MACKENZIE.

The Clinical Institute, St. Andrews, Aug. 14th.

CAPILLARY PRESSURE.

SIR,—As Dr. Gillespie persists in ascribing to Professor Leonard Hill views, statements, and assumptions which the latter has never made, I am not surprised that Dr. Gillespie finds that his conception of Professor Hill's work is, to use his own expression, absurd. It is, but only as conceived by Dr. Gillespie, certainly not as stated by Professor Hill.

Now as regards the retinal venous pressure phenomenon, Dr. Gillespie considers that this "implies greater pressure in the veins than outside them," and hopes that I may follow his argument. I certainly do to a *reductio ad absurdum*. If the pressure within the veins of the eye is greater than that outside their walls, how does Dr. Gillespie expect the aqueous to drain into the venous sinus of Schlemm's canal? No amount of equations or formulae will assist water to flow uphill.—I am, etc.,

Nottingham, Aug. 15th. THOMSON HENDERSON.

BIRTH CONTROL.

SIR,—Dr. Halliday Sutherland, referring to the questionnaire mentioned in my letter in your issue for July 23rd, inquires how many replies I received, and suggests that I was fortunate if I received twenty. He will find full particulars in a paper published in *The Journal of State Medicine* for November, 1918, but I may say here that the number was seventy-four. Of these, fifty-two were of opinion that the contraceptives mentioned in the questionnaire were not injurious to health under ordinary circumstances, as against ten who thought that they were injurious. The remaining twelve either were not prepared to express a definite opinion on this point, or for other reasons could not be classified yes or no.

Dr. Sutherland states that sterility is less common in countries such as Ireland or Spain where birth control is not practised. One would like to know his authority for this statement, and also whether he distinguishes between true sterility, which is, of course, the point under discussion, and voluntary sterility, which is quite another matter.

I cannot understand why Dr. Sutherland should take exception to my suggestion that in order to avoid possible self-reproach later in life all young couples (under ordinary circumstances) should be advised to make sure of some children before practising birth control.

Finally, Dr. Sutherland asks: Does birth control make for happiness? That is a definite issue. Granted that under certain circumstances which frequently arise limitation of the family is indicated—and the vast majority of thinking people now agree that it is so—I maintain unhesitatingly that the use of properly selected contraceptive methods do certainly conduce very materially to happiness. They enable marital relations to be maintained between married couples. The only alternative, the

cessation of marital relations, camouflaged by the opponents of birth control under the term "self-control," mutilates and nullifies marriage, and places upon most normal young couples an intolerable and altogether unnatural strain.—I am, etc.,

Leicester, Aug. 8th. C. KILLICK MILLARD.

SIR,—Dr. Scharlieb opposes birth control on medical as well as other grounds. The question, however, involves a much wider, much deeper controversy than that—it raises once again, as is raised in the venereal disease problem, the fundamental difference between the moralist and the materialist. It is not to be wondered at if the moralists in our profession are outnumbered by the materialists, for the whole structure of medical knowledge is built upon a materialistic foundation of anatomy and physiology. Hence it is doubtful if the medical profession will ever speak with one voice on any question involving a moral issue.

Birth control is but one of a series of social problems of which the individual members are intimately related one to another, and it is by no means easy to take it up without touching at times on these other questions. What is it the neo-Malthusian aims at? To reduce the size of the family to a manageable level—a level, that is to say, commensurate with the conditions under which the parents are living and working: conditions of wages, of health, and of housing. The object is praiseworthy; the means recommended are, if widely adopted, likely to prove a mixed blessing, whether the possibilities be examined from the standpoint of domestic happiness or national expediency.

"What shall the people do?" says Dr. J. C. Jones in your issue of August 6th. "Shall they use 'preventives' or shall the men rest continent? The easiest way out of the dilemma is the artificial restriction of the family," and many will agree with him. But the easiest way out of a difficulty may well prove to be the surest road to ultimate disaster. Morally, the doctrine is indefensible—it follows the line of least resistance and sacrifices the spirit to the flesh. Materially, it is fraught with grave danger to the home and to our national existence. It is proposed to disseminate a knowledge of contraceptive methods throughout the overcrowded homes of the ill-fed, ill-clad poor. Now it is in these homes that the moral sense has already but little chance of development, where the child of 8 or 10 already knows far more than is good for the health of either body or mind, and though we may succeed in reducing the size of the family, yet the means we employ will militate against the raising of the moral tone of the household, and the children will not be any less precocious than before. Further, what results may we look for from the national point of view? A reduction in the birth rate? But how far is the birth rate to be reduced, and at whose command will the process—a downward process—come to an end?

The late Sir William Osler, speaking of syphilis, says: "Personal purity is the prophylaxis which we as physicians are especially bound to advocate. Continence may be a hard condition . . . but it can be borne, and it is our duty to urge this lesson upon young and old who seek our advice on matters sexual." Here, too, are we bound to take up a similar attitude. Morally it cannot be assailed, and it does not imperil our family and national existence as does the previous doctrine.

I have said that it is doubtful if the medical profession will ever speak with one voice on matters involving a moral issue, and herein lies our weakness. For we are all servants in one of the greatest "ministries" in the world—the real ministry of health. We see more, we know more of the strength and weakness of human nature than any other body of men, and we are constantly meeting questions of individual or social morality. This is where we suffer through having no settled doctrine—a great teaching ministry, we are "by schisms rent asunder," and each one of us preaches a doctrine according to his own personal beliefs. For as long as this state of affairs shall continue, for so long will mankind look to us in vain for that wise moral guidance which we have unique opportunities for imparting, and which is one of the crying needs of the present-day world.—I am, etc.,

August 9th. S. M. J.

EDUCATIONAL GRANTS FOR CHILDREN.

SIR,—The War Emergency Fund was founded in 1916 to assist medical men after their service abroad on their return to practice.

The committee has already expended £18,000 in grants; it still has ample funds in hand and is prepared to make liberal grants towards the cost of education and, if necessary, to pay the school fees of the sons or daughters of any medical man who, as the direct consequence of having held a commission in the army during the late war, finds himself unable to give as good an education to his children as he would otherwise have been able to do.

The committee is also prepared to consider applications for grants in such cases, in order to aid in education at the universities and the medical schools and in training for the professions.—I am, etc.,

G. NEWTON PITT,
Hon. Secretary.

11, Chandos Street, London, W.1,
August 14th.

THE NEW DENTISTS ACT.

SIR,—Although the Dentists Act, 1921, has now received the Royal assent and has become law, it will not be possible for the new Dental Board to be constituted for some months and, until this is done, no registrations can be effected.

From inquiries I have received I think it is advisable to warn registered medical and dental practitioners that the position of unregistered persons practising dentistry is at present unchanged. Many of them no doubt will in due course be registered, but, until they are, the *Warning Notice* of the General Medical Council in regard to association with unregistered persons holds good.—I am, etc.,

NORMAN C. KING,
Registrar.

General Medical Council,
44, Hallam Street, London, W.1,
August 10th.

Obituary.

COLONEL WILLIAM HENRY BULL, K.H.S., V.D., A.M.S.(T.F.Res.).

COLONEL WILLIAM HENRY BULL died at Stony Stratford on August 14th. He was educated at St. George's Hospital, and took the diplomas of M.R.C.S. in 1874 and of L.R.C.P.Lond. in 1875; he took the F.R.C.S.Edin. in 1882. After filling the posts of house-surgeon and assistant surgical registrar at St. George's, he went into practice at Stony Stratford. He held the Volunteer Decoration, and on June 3rd, 1913, was appointed Honorary Surgeon to the King. He was a Knight of Grace of the Order of St. John of Jerusalem, and an honorary associate, lecturer, and examiner, St. John Ambulance Association. He was a member of the British Medical Association, and had been president of the South Midland Branch. He became a member of the Naval and Military Committee of the British Medical Association in October, 1913, and served thereon for several years. He was also a member of the Ministry of Pensions Sub-committee of the Medico-Political Committee for 1920–21. For many years he had been a member of the Bucks Territorial Force Association, and after the war was appointed County Director of the Bucks branch of the British Red Cross Society. His son, Lieutenant G. J. O. Bull, 2nd Field Company, East Lancashire R.E.(T.F.), was killed in the Dardanelles on July 8th, 1915.

Colonel P. BROOME GILES, C.B., writes: With great regret I hear of the death of my very old friend, Colonel W. H. Bull of Stony Stratford. We were intimately associated in Volunteer medical reforms, and worked together down to his death without a single disagreement. Soon after beginning practice he took a commission as surgeon in the Bucks Volunteers, and worked hard to make the Volunteer Medical Service a reality. He passed through the various steps, and in 1890, when Volunteer brigades were formed, he raised the Bearer Company of his brigade, and its early completeness and efficiency was entirely due to his personality and energy. He attended a course of instruction and obtained his pass at the Volunteer Ambulance School of Instruction, and directly I was selected as commandant actively joined the school as an instructor. When in 1898 he became the S.M.O. of his brigade, he

became a vice-president and continued to hold that position until on the advent of the Territorial Force the school dissolved as the necessity for it ceased. During Colonel Bull's association with the Volunteer Ambulance School of Instruction some 768 medical officers and 12,000 N.C.O. and men obtained pass certificates. Between 1901 and 1908 Colonel Bull was honorary secretary of the S.M.O. Association which originated with the sole object of bringing volunteer medical officers together with the ultimate idea of welding the volunteer medical officers of yeomanry, engineers, artillery, and infantry into a corps similar to and co-ordinate with the R.A.M.C. Eventually we agreed on many points, and a deputation of myself, Bull, Raglan Thomas, and Andrew Clark, presented our case before Lord Raglan, the then Under Secretary of War to Mr. Brodrick (now Lord Midleton); eventually all our demands, except two, were granted. In 1912 Colonel Bull became A.D.M.S. to the South Midland Division and at the outbreak of the war worked hard. Later he was sent to Birmingham on recruiting work, and did splendidly till demobilized in 1919. In the county of Bucks, where his ingrained common sense and feeling for justice soon gave him a firm position, he was made a D.L. and J.P. As a Freemason he attained a very high position, and was in great demand at all important ceremonials. After the war he was appointed county director to the Bucks branch of the British Red Cross Society, an office in which his reputation as an organizer of military medical units and his knowledge of training St. John Ambulance served him well.

H. E. CUFF, O.B.E., M.D., F.R.C.S.,

Principal Medical Officer, Metropolitan Asylums Board.

WE regret to announce the tragic death of Dr. Herbert Edmund Cuff, O.B.E., Principal Medical Officer to the Metropolitan Asylums Board, who was drowned while on holiday on August 16th. When bathing in a rough sea at Burnham Overy, Norfolk, Dr. Cuff's two young daughters, both of whom are said to have been good swimmers, got into difficulties, and Dr. Cuff, who was watching them from the beach, went to their rescue. All three were, however, carried away by a strong tidal current and drowned. Dr. Cuff, who was 57 years of age, was educated at Guy's Hospital, graduating M.B., B.S.Lond. in 1888, and M.D. in 1891; he took the diploma of F.R.C.S.Eng. in 1890. After having acted as house-physician at Guy's and as resident medical officer of the Leeds General Infirmary, he entered the service of the Metropolitan Asylums Board in 1893. He was appointed medical superintendent of the North-East Fever Hospital in 1897 and held the appointment for eight years, when he was attached to the staff at the head office, subsequently attaining the position of principal medical officer to the Board. During the war he was resident head of the Belgian Refugee Camp at Alexandra Palace; for this work he was awarded the O.B.E. He was the author of *Lectures on Medicine to Nurses*, part author of a work on practical nursing, and contributed to medical literature on the subject of infectious diseases. He is survived by his widow, with whom much sympathy has been expressed; she is the daughter of Dr. Philip Nunn, medical officer of health of Bournemouth.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

MR. F. J. W. ROUGHTON, of Trinity College, has been elected to the Michael Foster Research Studentship in Physiology, value £200. The Raymond Horton Smith prize in medicine has been awarded to Dr. R. L. M. Wallis of Downing College.

UNIVERSITY OF ABERDEEN.

THE late Miss Kate F. Grant, of Cullen, bequeathed the residue of her estate, amounting to over £2,000, to the University of Aberdeen for the purpose of founding bursaries in the Faculty of Medicine, to be called the Grant medical bursaries. The University Court, after consultation with the Senatus, will decide the amount and award of the bursaries, but preference will be given to candidates born in, or having a substantial personal connexion with, the parishes of Cullen or Huntly.

Medical News.

AT a meeting of the Privy Council held at Buckingham Palace on August 10th the King approved an Order in Council providing for the official termination of the late war at midnight on August 31st, 1921. The Order is of general application, except in regard to the Ottoman Empire.

THE Duke of Connaught opened, on August 13th, the nursing home which he has presented to Bagshot in memory of the late Duchess of Connaught and the Crown Princess of Sweden. The hospital, he said, was not a charity, but was intended to be of medical and surgical assistance to those who might unfortunately require it. The hospital, we understand, is open to any practitioner in the parish for the reception of his patients under his own care.

SIR STCLAIR THOMSON has had conferred on him the distinction of Chevalier de la Légion d'Honneur for services rendered in France with the Croix Rouge Française during the war.

A SPECIAL post-graduate course will be held at the Prince of Wales's General Hospital, Tottenham, N.15, from September 26th to October 8th. It will include practical demonstrations on clinical and laboratory methods each morning, demonstrations on groups of selected cases, general hospital work, and a clinical lecture each afternoon. Lectures will be given, among others, by Mr. C. J. Bond, C.M.G., of Leicester, on "Latent infections"; Mr. James Berry, on "The diagnosis of thyroid swellings"; Colonel W. H. Harrison, on "The routine treatment of syphilis and tests of cure in gonorrhoea and syphilis"; Colonel Byam, O.B.E., on "The invalid from the tropics"; Dr. Arthur Giles, on "Sterility"; Mr. H. D. Gillies, on "Plastic surgery"; and Sir W. H. Willcox, on "Diabetes." Practical demonstrations will also be given in associated special hospitals. Luncheon will be obtainable in the neighbourhood and tea will be provided each day in the hospital. A syllabus will be issued in due course and further information may be obtained from the Dean.

THE first travelling scholarship prize awarded by the People's League of Health has been won by Mrs. M. C. D. Walters, who during the war worked in the maternity hostels for Belgian women. Mrs. Walters will visit Brussels and other parts of Belgium, and make a report to the League. The prize is given in connexion with the Sims Woodhead health lectures, which will be resumed in October.

THE Voluntary Hospitals Commission continue to receive numerous applications from individual hospitals, and to avoid misunderstanding they are anxious to make it known that grants will only be made on the recommendation in London of King Edward's Fund, or in the provinces of the local Voluntary Hospitals Committees. Steps are now being taken in co-operation with the county and county borough councils to establish these local committees, and any inquiry as to whether a committee has already been appointed for a particular area should be addressed to the Clerk to the County Council. Hospitals are asked to defer their applications until the local hospital committee has been appointed, and in no case should any hospital apply direct to the Commission.

THE National Health Society has arranged for two training courses—the one for health visitors and infant welfare workers, and the other for the examination of the Sanitary Inspectors' Examination Board. The course for health visitors, which is recognized by the Board of Education, extends over two years, and includes theoretical work, practical training by full-time attendance at an infant welfare centre, and special training at a Poor Law infirmary, maternity hospital, infants' nursing home or similar institution. A course of practical instruction will be arranged at an ophthalmic hospital for the observation of cases of ophthalmia neonatorum. The full fee is £50. There is also a shorter course for both theoretical and practical training, arranged in regard to the previous knowledge and experience of students; the fee for this is £25. The fee for the course for the examination of the Sanitary Inspectors' Examination Board is £16 16s. Full particulars can be obtained on application to the Secretary of the society, 53, Berners Street, Oxford Street, London, W.1.

DR. W. H. PIMBLETT has been elected chairman of the Preston Insurance Committee, and Dr. R. H. Wagner chairman of the Plymouth Insurance Committee. Dr. Pimblett is physician to the Royal Infirmary, Preston, and a medical officer to two of the union districts. Dr. Wagner is honorary secretary of the Local Medical Committee.

IT is expected that the Registrar-General's preliminary report of the Census giving the figures for counties, boroughs, urban and rural districts, and parliamentary areas will be published next week.

THE Great Northern Hospital has received from King Edward's Hospital Fund a grant of £1,550 for the new nurses' home and other extensions from the final distribution of surplus Red Cross Funds.

A CONFERENCE convened by the International Red Cross Committee and the League of Red Cross Societies met in Geneva on August 16th for the purpose of considering what steps should be taken to relieve the conditions in Russia due to the famine. One result of the famine will almost inevitably be the spread of disease, especially of cholera and typhus fever, and a consideration of this aspect of the question by the conference is of supreme importance. In this connexion it is of interest to learn that at a meeting of the Supreme Council, held in Paris on August 14th, Lord Curzon emphasized the necessity for taking steps to protect Europe against these diseases, and urged the nations to provide funds for the purpose. This country has hitherto found adequate protection in the activities of the port sanitary authorities, which are kept well informed by the Ministry of Health of the progress of epidemics in all parts of the world. They are thus made aware at any moment from what part of the globe a particular disease is to be expected, and can take appropriate preventive measures.

DR. ALEXANDER MCNAUGHTON, J.P., for forty years medical officer of Ardnamurchan, has, on the occasion of his retirement, been presented by the parish council with a silver rose bowl and wallet of Treasury notes in recognition of his services. Mrs. McNaughton was the recipient of a gold wristlet watch.

PROFESSOR WIDAL has been appointed Grand Officer of the Legion of Honour.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2630, Gerrard.

2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.

3. MEDICAL SECRETARY, *Meditecra, Westrand, London*; telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*: telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*: telephone, 4361, Central).

QUERIES AND ANSWERS.

TREATMENT OF ASTHMA.

DR. W. J. MIDELTON (Bournemouth) writes, in connexion with Dr. Collins's letter on asthma in the BRITISH MEDICAL JOURNAL, August 6th, 1921: A short time ago a young laundress consulted me, accompanied by her mother. Both asserted that she had not drawn a comfortable breath, night or day, for fourteen years. I applied the galvano-cautery to the back of her neck, six small "dots." That night she slept well, and, by continuing the treatment, I have cured her asthma.

BRONZE POWDERS.

INDUSTRY.—The bronze powders used in printing and lithographic establishments contain copper and zinc with occasionally a minute trace of arsenic. Bronzing is now largely done by machinery, and is therefore not nearly so dusty a process as it was. The dust, being extremely light, floats in the atmosphere of the workroom and becomes entangled in the hair and folds of the clothing of the girls employed. It is apt, if it remains upon the skin, to cause considerable itching. When inhaled it causes respiratory catarrh, and when swallowed dyspepsia followed by anaemia.

LETTERS, NOTES, ETC.

RELATION OF ANKYLOSTOMIASIS TO MALARIA.

DR. D. BRIDGES calls attention to two mistakes in the report of his paper on this subject read at a meeting of the Malaya Branch, and published in the JOURNAL of July 30th (p. 149). The errors occur in the treatment with oil of chenopodium. This should be preceded by sodium bicarbonate and sodium sulphate, ½ drachm of each—not 1 drachm as in the case of the beta-naphthol treatment; also, the 2 c.cm. of oil of chenopodium should be given with 1½ oz. of castor oil—not 1 oz. This Dr. Bridges considers important, as the chenopodium must be well mixed in a large quantity of oil, for chenopodium, if not well diluted, often sets up chronic enteritis, and might cause extreme collapse or even death.

VACCINATION TREATED LOCALLY WITH CASTOR OIL.

DR. E. H. MYLES (Chichester) writes: Lately all cases of vaccination or revaccination showing excessive local reaction are treated as follows with the most satisfactory results. Take some cotton-wool and dab over the whole inflamed area with castor oil. Cover it with a square of boric lint, pinned in position. Put the arm in a sling, excuse the patient all duties, and direct him to attend daily for the same treatment. The lint should be large enough to enfold the arm loosely. The opposite (diagonally) corners are fastened inside the arm with a safety-pin. The upper corner is similarly fastened to the inside of the shirt or vest, but near the shoulder; the lower corner lies loose. This is not a lightning cure, but from the very first application all untoward symptoms are checked, the inflammation begins to subside, and continues to do so.

A FLY TRAP.

WE have lately seen a specimen of an ingenious fly trap, which we understand has been favourably reported on by a number of medical officers of health both in this country and in the United States. It is simpler in construction than the Japanese fly trap described by Captain Gilchrist in our issue of January 5th, 1918 (p. 40), about which we had many inquiries. It appeared, however, that the Japanese revolving wooden drum fly-trap was not manufactured in this country and could not be procured except in the Far East.

The "Curry" fly and wasp trap consists essentially of a gable-shaped metal framework, the upper part being covered with wire gauze. The galvanized iron base has a dark chamber with a slit at the top to admit light. An attractive bait, such as fish heads or sweetened vinegar, is placed in a pan set under the trap. When it leaves the bait the fly is attracted by the line of light, and entering the trap is caught. The apparatus is easily set up and appears strong and durable; it folds up flat for packing.

The trap is simple, and we are informed that it is very effective. The sample we saw contained thousands of dead flies, said to have been caught on the previous hot day in a private garden near a municipal rubbish heap. The size at the base is fourteen inches square, and the height to the top of the gable is about the same. The American Government, it is stated, bought 100,000 of the traps in 1918. It is sold in this country by Mr. W. Burton (160, Brondesbury Park, London, N.W. 2) at the price of 12s. 6d. post free in Great Britain.

A CORRECTION.

IN referring to the annual report of the James Murray's Royal Asylum, Perth, last week (p. 257), Dr. D. Maxwell Ross was erroneously referred to as the physician-superintendent, instead of Dr. W. D. Chambers; Dr. Ross resigned the post last year and unhappily died shortly afterwards.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 29, 32, 33, 34, and 35 of our advertisement columns, and advertisements as to partnerships, assistantships, and locum tenencies at pages 30 and 31.

THE appointments of certifying factory surgeons at Dunkeld (Perth) and Somercotes (Lincoln) are vacant.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

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An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.